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EDITORIAL NOTES.

The Awakening.

THE hall of the Institution of Mechanical Engineers was filled by those attending the Maintenance Conference on Wednesday last, and the proceedings were, from the beginning to the end, highly stimulating. A proportion of those present are already practising inspection and maintenance; others are sitting on the fence; but comparatively few were there who are really opponents to the taking of the step to the application of a service method which all reasoning shows to be the one which stands to the fore as both a business protector and promoter. The conference once more illustrated the fact that those who have adopted inspection and maintenance, and have experienced the effects, are the ones who speak most enthusiastically regarding the resulting new attitude of consumers, the greater confidence which reigns, the reduction of complaints, and the greater development of business which comes from satisfaction and contact, while those who cut short their service at the doorstep of the consumer are those who doubt, and are still inquiring. There were more of these absent from than present at the conference; yet they are the ones whom the promoters would have preferred to see crowding the hall. But example and experience go a long way to produce conversion of opinion and inspire action; and the conference was fruitful of both, as related in the fairly full report which we publish in this issue. Those who have doubts as to the material fortification of business by inspection and maintenance, or who are deterred from doing what is right by the bogey of liability, should read the report; and if that will not dissipate any question or fear, then nothing will do so, other than seeing loss of business, while the more enlightened are making good headway. We have—and we say it emphatically—great confidence that this account of experiences, by men from all quarters of Great Britain, and working under a diversity of circumstances, will have excellent effect in carrying the policy of maintenance well along the road to universal adoption. To the value of the proceedings, Mr. John E. Cowen, the Chairman of the Newcastle and Gateshead Gas Company, who presided, made splendid contribution by the manner in which he directed and kept the discussion to the lines of consideration which he had mapped out as likely to produce the greatest benefit. No roving was allowed over a vast area of essentials and odds and ends; there was concentration at the morning sitting on principle, and at the afternoon sitting on separate detail.

Among the philosophic things which were said on this occasion—an occasion full of purpose in the interests of the industry—was this by Mr. Cowen: "The new Electricity Act is meant to be the prelude to, and the instrument for ensuring, a great era of progress in the application of electricity to domestic and industrial problems. It is for every gas administrator to see that the development of the era is not facilitated and forwarded by failure to strengthen the foundations of his undertaking, but rather that the progress of electricity is attended and preceded by still greater progress on the part of gas brought about by an enlightened policy of service to the consumer." In those sentences, we have an appeal for the broadest possible outlook, and the application of the most effective methods to gas trading. The same thing is found in the letter which was read at the conference from Sir David Milne-Watson, in which he said: "The popularity of each undertaking among the "individual customers, based upon efficient and courteous "service, is the surest bulwark against the rising tide of "competition." There we have concentrated the views on the subject of two prominent gas administrators from North and South; and they agree in the line of policy which should be pursued. At the same time, important as is the factor of competition in the consideration of this question of the application of the policy of inspection and maintenance, we should be sorry to give it precedence. A higher reason is duty. We know that, where supervision by the gas undertaking is not practised, piping and appliances are not efficiently maintained; notwithstanding that efficiency in those directions is the last stage in the operations which commence at the works, and which produce and deliver, or should do so, gas of uniform calorific value, specific gravity, and pressure to the service-pipes of the consumers. To stop the work of promoting efficiency at the penultimate stage is to neglect the most vital and delicate part in the whole system of gas supply. The matter appears so clear that, altogether apart from competition, it passes understanding that there should exist any undertaking where the traditions of the past in this regard are applied to present circumstances, and threaten in some cases to be applied to those which the lines of development enable us to visualize.

However, progress is being made in this important question. There was proof of this in the unanimous adoption of the resolution, submitted by Mr. F. W. Goodenough, the Executive Chairman of the "B.C.G.A." It recorded that, in the opinion of the conference, an efficient system of periodical inspection and maintenance of gas appliances in all consumers' premises (backed by a constant supply of gas adequate to meet the maximum demand) is essential to the permanent prosperity and future progress of the gas industry, and to the complete fulfilment of its duties to the community; and that to this end every possible facility and encouragement should be given for the education and training of the personnel necessary for carrying out the work entailed. All who voted for that resolution, after the convincing survey and argument advanced by Mr. Goodenough and others, pledged themselves to universal maintenance as being essential to prosperity and progress; it also accepts the principle that inspection and maintenance is the complement to the fulfilment of the duty of a gas undertaking to the community.

But though there is such a wide acceptance of the policy being right, there are some whose imaginations cause them to find a barrier of one kind or another to application. One of them is that of responsibility for any mishap which may occur on a consumer's premises subsequent to inspection and maintenance. Mr. Goodenough made it perfectly clear that there can be no responsibility, unless there is negligence. We fail to see why this question of responsibility should be raised in relation to the inspection of piping and appliances when all progressive concerns under the prepayment meter system willingly take upon themselves the responsibility of carrying out complete installation from main to burner in the houses of (shall we say?) 50 to 60 p.ct. or more of their customers. It is all

very much a question of well-trained men, and good supervision. When we look at ghastly illustrations of neglect and potential danger such as Mr. Harry Clark, of Derby, exhibited at the conference (and which were only discovered in consumers' houses by inspection), and remember the specimens found when Glasgow took to inspection, the truth is borne in upon us that a far greater responsibility than the vague one which deters rests upon those entrusted with the care of the interests of a gas undertaking. The matter should be approached in no timid manner, but from the point of view of duty—duty not only to the consumers, but to the capital and business of the undertaking. The adherence to a policy of irresponsibility and neglect beyond the meter is bound to meet its Nemesis in one form or another. If we are to safeguard consumers and business, if we are to give them the means of realizing maximum efficiency, if we are to make maximum progress in face of intensified competition, then we must apply to our business the methods which are most productive of these things. There is no use shirking the issues or the means. In the same line of consideration is the idea that this is the beginning of Government interference and of legislation to compel inspection and maintenance. It is not, as was declared by Mr. Goodenough. But supposing it was, there would be no cause to quake. Why fear, if it is agreed that the principle is right? But we do not want Government ordinance in this matter. Its institution and imposition would suggest to the public an altogether wrong view—a view unsupported by experience, notwithstanding the startling conditions in which some pipes and fittings are found to be, owing simply to the fact that there are gas suppliers who have been energetic up to the meter, but no farther. The surest way of obviating legislation or compulsory action in this matter is by voluntary application of the policy of inspection and maintenance. Then again, there may be some gas engineers—like Mr. H. C. Smith, of Tottenham—who consider that, antecedent to the institution of a regular system of inspection and maintenance, there should be preparatory work. Mr. Smith is in favour of the inspection and maintenance policy; but he thinks that, prior to application, distribution systems should be put into order so that pressures may be rendered constant the whole twenty-four hours. That is an ideal state. But the whole of the parts of any one distribution system are not deficient; where pressures vary through a local deficiency of conveying capacity, there will admittedly be a lapse in efficiency with any departure of supply from the conditions under which consumers' appliances have been adjusted. But we cannot wait. The temporary deficiency in local pressure is only one point of consideration in this large question of inspection and maintenance. There should be, as early as possible, rectification of the deficiency; but that should not hinder the work on consumers' premises, with its resultant general better efficiency and security than some of them can at present boast.

The testimony of the conference is that many advantages and gains accrue from inspection and maintenance. Generous illustration is found in London, Glasgow, Newcastle, Croydon, Dundee, and many other places which could be mentioned. We ask those who so far have refused to have anything to do with inspection and maintenance what they have to show to compare with the experiences concerning which we have published much. We ask them to tell us what they know of the actual gas conditions existing behind the front doors of their consumers' houses. There is a vast ignorance of those conditions. Is that right? Is it good and sound policy to allow that to continue? We know that it is almost useless asking these questions, because where the system has not been adopted and inaugurated, there exists a certain reticence. And why? Because there are weaknesses in the case, which look bad when brought into contrast with the benefits which are obvious to all reasoning minds, and actual in the experiences of several gas undertakings. The gas industry has to look forward as well as to the present.

We trust that consideration of these matters, in conjunction with the discussion at the conference, will issue in a substantial movement in establishing this remarkably fertile aid to increasing the stability of the gas business and assuring a good rate of progress. If that results, all who took part in the organization of the conference, and in promoting attendance at it, will feel that their efforts have been well rewarded. There are a few points of detail, brought under consideration during the discussion, upon which comment may be made next week.

Flexibility in Gas Manufacture.

GAS supply and demand are governed by no single law. The demand is variable, and is made so by the requirements of consumers at different times of the day, by temperature and other atmospheric fluctuations, by darkness and natural light, and by the seasons of the year. Thus it is the supply of gas must in these circumstances be as flexible in volume as possible, and constant in calorific value, specific gravity, and pressure. Those are complex conditions with which to deal; and yet the gas industry has shaped itself, and is still better shaping itself, for meeting all factors which cause variation in demand. An excellent contribution to the subject was made by Mr. T. Campbell Finlayson, M.Sc., of the Research Section of the Woodall-Duckham Companies, at a recent meeting of the Western District of the Scottish Junior Gas Association (*ante*, p. 392); and we make allusion to it here to ensure that it is not overlooked, embedded (as it was) in the mass of interest found in the "JOURNAL" last week. The question is one which has an important bearing upon the success of the industry in these times.

There is no other industry supplying an agent for light, heat, and power which could meet the considerable fluctuations of demand with such satisfaction as gas undertakings can do. There are, however, two aspects of the matter which must not be overlooked. The first is that the fluctuations in demand are likely to become more and more severe with the development of domestic heating by gas; and the second is that, while we pride ourselves upon the degree of flexibility already possessed, it will have to be increased and brought up to the very finest standards of operation which research and experience show to be attainable. The subject is one of which the "JOURNAL" made special point last year; and articles and correspondence showed that a good deal of interest is being taken in it. Much of the work that is being done is to enable gas suppliers more readily to cope with unexpected peak loads, which are the troublesome ones, and which call for the means for taking very prompt action. Those which are expected—such as the dinner load on Sundays—can be easily negotiated; but Mr. Finlayson is obviously of opinion that some of the suggestions which have been made for this purpose are not without defect. We fear that some defect or other could be found with most processes, whatever their nature. He points out that systems of complete gasification will produce gas quickly; but they usually involve the distribution of gas of a high specific gravity, which tends to disorganization of distribution and combustion. To a less degree, he says, this also applies to carburetted water gas when added in large quantities to normal coal gas, owing to the higher specific gravity of the former. Mentioned in the paper is the interesting process with which the name of Messrs. Humphreys & Glasgow is associated, and which proposes to make a normal coal gas, to which a sufficient quantity of producer gas is added to give it the same specific gravity as blue or carburetted water gas. By such working, it is obvious that the two gases, having the same calorific value and specific gravity, can be mixed in any proportions required without in any way disturbing the regulation of consumers' gas appliances. That, of course, is an enormous advantage, in view of the fact that flexibility is attained at one end without any disorganization at the other. The process was referred to in the "JOURNAL" for July 28 last. Mr. Finlayson fears that the cost of distributing such gas would be high. We are not sure what he means by the term "high." With the distribution of coal gas containing producer gas, there has, we fancy, been a very large amount of experience in this country, through the energetic operation of exhausters on retorts that have not been samples of perfect soundness. But that the cost of distributing it was high does not appear to have struck the responsible engineers. As a matter of fact, in the proportions in which it would be necessary to distribute it under such a system as that in which Messrs. Humphreys & Glasgow are concerned, we

do not think there would really be any material difference in the cost. Mr. Finlayson says that he does not know whether the process has been adopted in this country. If he will look at the "JOURNAL" for Aug. 18 last (p. 377), he will see that something of a cognate nature has been in operation at Southend, as described by Mr. T. F. Canning; and Mr. R. G. Shadbolt, in our issue for Aug. 11 (p. 314), had something to say upon experience in the same direction. Allusion is also made in the paper to the account which Mr. G. M. Gill gave in our columns for June 2 last (p. 451) of the system for rapidly producing gas from fuel oil for peak load supply. However, it is held by Mr. Finlayson that, while such processes are of interest for meeting sudden peak loads, for seasonal demands they cannot be regarded as being likely to replace normal carbonizing processes for the production of cheap gas.

From this point the author passes to the consideration of the advances accomplished, and work which is proceeding, to produce still higher flexibility in continuous vertical retorts. Although it may be said that Mr. Finlayson may have a little inclination in his views regarding the continuous vertical retort, the fact remains, and there is demonstration throughout the country, that the flexibility of the system is wide, and is capable of considerable variation up or down. In the first place, gas output can be increased or decreased by simply altering the rate of extraction from the bottom of the retort; but that is not all. By steaming, and by using graded coals (as shown by Mr. T. F. E. Rhead in his Institution paper last year), production can be increased; and, as the Fuel Research Board have proved by the researches at their station, the injection of oil into the charges also supplies another method whereby a greater outflow of gas per retort can be promptly and successfully obtained.

Apart from these matters, much interest is found in the account which is given regarding the interesting carbonization scheme which has been adopted for the Dawsholm Works of the Glasgow Corporation Gas Department. The new plant is to be of two types. One section will be composed of Woodall-Duckham continuous vertical retorts, and the other of Woodall-Duckham intermittent vertical chambers. The object in adopting two types of plant is to realize, on the one hand, good flexibility, and, on the other, the ability to use non-caking coal by blending with caking coal; so that while the gas-making properties of the former (which is relatively cheaper) can be used, a satisfactory coke can also be realized. It is intended that in the continuous vertical retorts, Scotch "run-of-mine" coals above 1 inch will be carbonized; and in the intermittent vertical chambers a blend of washed "run-of-mine" smalls and washed caking smalls will be utilized. The whole of the coke from the intermittent vertical chambers will be available for sale; and the requirements for heating both sections of the plant will be met from the continuous vertical retorts. The methods by which the coal is dealt with, and the blend obtained, are described by Mr. Finlayson. It is obvious that the plant and methods outlined by him will give a wide range of flexibility as regards output, choice of coal, quality of products, and calorific value. The paper is a useful contribution to a subject of great importance in these days when the variable demand for gas calls for so much accommodation from the gas-producing end.

Protection of the Stockholder.

ADMINISTRATORS of gas company undertakings who desire to read a good case for the incorporation in their sliding-scale of a basic or minimum dividend, will find it in the address which Mr. W. Graham Bradshaw delivered to the proprietors of the Commercial Gas Company last Thursday. In the part of it dealing with this subject, he covered in succinct form a range of argument which can be adduced in support of the change, which is no innovation, having regard to the pioneer action of the South Metropolitan Gas Company, and of the introduction last year of a minimum dividend into the sliding-scale of the Gas Light and Coke Company. We are all acquainted with the limitations which are upon the Board of Trade—and which operate unfairly for gas undertakings—in regard to the revision of standard prices under Section 1 of the Gas Regulation Act. Mr. Bradshaw pointed out how the restrictions place out of court several considerations which should apply in these times when the bare cost of gas production is not the only change in circumstances which materially influence the overall expenses of working a gas undertaking, and which apply as much to the supply of the consumers as the direct costs of the materials and labour required in manufacture. This is a point on which the National Gas Council have made representations to the appropriate Government Departments, with the view to obtain an amendment of the Act; but so far there has been no movement to that end. It is due to this deficiency of the Act, as well as to the happenings during wartime and subsequently, that the Directors of the Commercial Company have decided to follow the lead of the South Metropolitan Company in bringing their stock under a basic or minimum dividend.

The Bill for this purpose will be under the consideration of Parliament this session; and it provides for a 5 p.ct. minimum dividend on the existing ordinary stock, and 6 p.ct. on future issues, and for the division of surplus profits between the consumers, stockholders, and employees. The noteworthy point was made by Mr. Bradshaw that, while the sliding-scale, for a period after its introduction, gave general satisfaction, as the years progressed the consumers' share gradually increased, while the stockholders' share proportionately decreased. In 1875 the ratio of benefit was 3 to consumers and 1 to stockholders; at the present time the ratio is 6 to 1. In the old days, the difference between the lion's share to consumers and the modest one to stockholders was a point which was held up by gas companies as a feature for acceptance, and even admiration, by public authorities who were looking after the interests of the public. But the day has long passed since the old ratio which existed in the early years of the operation of the sliding-scale has applied; and the change is unfair to stockholders, who now deserve the partial compensation and protection provided by a minimum dividend. It is, of course, greatly to the interest of the public that gas companies should be in a position to obtain capital at a reasonable rate by better stabilization of both dividends and market values, and a basic or minimum dividend is one way to secure this. Another proposal of the Company's Bill is that, like the South Metropolitan Gas Company, the employees are to have the right to elect representatives on the Board of Directors.

A few words regarding the operations of the Company during the past year. Despite the tragedy of the coal stoppage, wise administration and management have seen the Company through with an increase in the price of gas from 9·4d. to 9·8d. per therm, and from Christmas to 10·4d.; and they end the year with a carry-forward lower by only £534. This is excellent, as is also the fact—having regard to the industrial and trading character of the area which the Company serve so efficiently—that the gas sales exceed those of 1925 by 0·82 p.ct.

Distant Control of Pressures.

THE development of the policy of supplying gas to outer areas from central and well-circumstanced works makes very timely the article which Mr. H. C. Widlake, of Plymouth, contributed to our pages last week, on the subject of the remote control of district governors. Change begets change. The enlargement of gas-supply areas, and the greater distances gas has to be transmitted, bring into existence a new order of things and new problems, the latter of which must be solved with the view of assuring that efficiency of service in the outlying areas is as good as in the central district. Mr. Widlake has made a good contribution to the solution of the problem of producing certainty that pressures shall be maintained, despite demand, in an area distant from the works. Of course, this could not be accomplished if the subscribing conditions to distribution efficiency are not all of an adequate character. It is the business of the gas engineer to see that they are, for, in the modern applications of gas, constant pressure is a matter of very definite importance. The ideal is a constant pressure, whatever the draft on the mains, the whole twenty-four hours through; so that consuming apparatus adjusted at one hour will be right for any hour

of the day or night. Vacillating results on the premises of a consumer, due to oscillating conditions outside, cause irritation to the very person whose good opinion the gas suppliers wish to retain; and it is against that condition that it is necessary for them to defend the consumers and their own reputation in all parts of the area of supply. The old crude methods of regulating pressure in varying circumstances, with reliance on the human element some distance from the place of gas production and central supervision, have, to put it mildly, not been so satisfactory as is desirable.

In his article, Mr. Widlake shows that there are available means by which distant district governors can be controlled from the seat of gas production; and, by example and a graph, he proves that this can be done successfully. The latter fact adds to the interest which the article will arouse among responsible engineers faced with the problem of maintaining at all times adequate pressures in their outer districts; for this is not a case of an untried device, with which engineers are loth to experiment, though in all things which aim at advance someone has to make a start, otherwise we should not make any progress. What Mr. Widlake has done is to design a method of electrical control for distant governors—that is to say, control from the works; while the remote governing gear cannot fail to function without indicating the fact in an unmistakable manner. By its means, the booster attendant on the works has the same control over the governor situated (in the case described) 1¼ miles away, as though it were in the booster-house itself. This does away not only with labour charges, but with all inexact co-operation between the man deputed to hand-control a governor and the booster-house attendant. The article sets out in detail the items of the installation, and the methods of operation. It describes the electrical loading and unloading of the valves—and much else. It also explains that, owing to the distance from the works, it is impossible to transmit over the leased circuit sufficient power to operate the valves; therefore, they are operated by a local battery situated in the governor-house, and working in conjunction with relays operated by the very small amount of current which it is permissible to transmit from the works. The booster-house attendant, 1¼ miles from the governor, can actuate the two valves just as positively and reliably as though he were on the spot; and this would apply equally were the governor 5 miles away, instead of only 1¼ miles. Advantage can also be taken of the control circuit to provide a system of automatic verification, without the need for maintaining any additional circuit between the governor-house and the works. Carefully reading the article, we cannot see any point in which there has been oversight in the provision of safeguards to ensure a faithful response of the actuating parts to the operations of the attendant at the works.

This ingenious introduction for maintaining, in the area in question, constant pressure, notwithstanding fluctuations of demand, has, Mr. Widlake tells us, met with every success. The claim that it is a useful aid to the promotion of distribution efficiency and to that of gas use, appears, from the plain statement of facts in the article, together with the testimony of the graph, to be fully justified.

Which Supreme—Nation or Trade Unions?

ALL industries, commercial undertakings, and individuals felt the effects of the general strike last year; and no one can therefore be disinterested in the proposals of the Government for the amendment of the law relating to trade unions. Their intentions have not yet been specifically stated; but His Majesty the King, in his speech at the opening of Parliament, made reference to the fact that there is to be (as was previously well known) amending legislation during the current session. Reference has already been made to the subject in our editorial columns. There was a notable contribution to it in the debate in the House on Monday of last week, on an amendment moved by Mr. Clynes in the name of the Labour-Socialist Party. The amendment was a concoction of phrases, regretting the reference in the speech from the Throne to proposals for defining and amending the law with regard to industrial disputes, which (so the amendment said) indicate the intention of His Majesty's advisers to continue the partisan policy pursued by them in recent industrial conflicts, and, in the absence of any mandate, to diminish the power of organized labour to resist encroachment upon, or to improve, the already inadequate standard of living of the workers. The amendment also declared that legislation restricting the service of the trade unions would not be in the national interests. Mr. Clynes and his supporters had no definite knowledge as to what are to be the proposals of the Government; and in his speech, as in those of other Labour members, there was a strange vagueness and blindness as to the duty of the Government to replace uncertainty by certainty in respect of the interpretation of the law.

Mr. Clynes referred to the general strike of last year as "a crude and foolish proceeding," but a grand manifestation of loyalty of the members of the unions concerned. Since that time, we have had from certain leaders intimations that the next time there is a general strike—if there is a next time (which the wiser ones say there will not be)—the plans will be better laid. In view of this, and of the fact that the general strike of last year was "a crude and foolish proceeding," are such men as Mr. Clynes satisfied with the existing state of trade union law? They have to make up their minds whether the general strike was a right and proper thing; if not, then the law requires amendment. That is what the Government intend to submit to Parliament. Then again, in the general strike, employment contracts were illegally broken. Obviously, even the General Council of the Trade Union Congress had not thought of that when ordering the general strike; they had not considered that they had no power to override the law by ordering the breaking of agreements. On the legal aspects of these matters, we find such forensic luminaries as Sir John Simon, K.C., and Sir Henry Slesser, K.C., at variance; and when such men disagree on a question of interpretation, then there is good ground for taking steps to remove all doubt. There is also the question of "peaceful picketing." During the general strike, crowds of men thronged about the entrances to the establishments from the work of which they had been called; and their attitude in many cases had anything but a "peaceful" appearance. Some of the more belligerent found themselves in the hands of the police, and when before the Courts, in more than one case it was stated that they did not know they were breaking the law. When the General Council of the Trade Union Congress, eminent lawyers, and trade union members do not know the intentions of the law, then the case is clear for its amendment, so that in future there shall be no excuse for infraction. There is no idea of restricting the legitimate service of the trade unions; but the great disservice of the unions to the nation which was experienced last year requires to be dealt with effectively. To do that, the Government have sufficient mandate from the nation, whose will it was that defeated the general strike.

It is probable that some of those of the Labour-Socialist Party who were responsible for submitting the badly defeated amendment to the House wish now they had not been so foolhardy as to expose themselves and their acts to the unsparing criticism which they received—not only at the hands of the Government representatives and supporters, but from the Liberal quarter of the House. Outstanding among the speeches was that by Sir John Simon, who tore in shreds the attitude of the Labour-Socialists on this question of revision of trade union legislation; and he showed that—whatever may be the plans of the Government—it is their bounden duty to define and settle once and for all the actual legal limits of the unions. The threat that the Bill would be opposed clause by clause and line by line, as announced by Mr. Ramsay MacDonald before the actual form of the proposals are known, Sir John pointed out, is an indication that resistance is not to be on merits, but is a predetermined course which has nothing whatever to do with the nature of the proposals. Very fairly the point was also made that the Labour-Socialists in the House are supported largely out of trade union funds; and this fact, it is obvious, must influence their conduct in a time of such a crisis as that which obtained last May. It also fetters them in their decisions on all labour questions; and, when national interests are opposed to trade union interests, they are compelled to throw their weight against

the former in order to uphold the latter. As Sir John Simon says, the Labour-Socialist Party have now to make up their minds whether they intend to defend the use of the general strike, or do the contrary. They are on the horns of a dilemma.

The General Council of the Trade Union Congress will not be in the least happy under the scathing criticism to which in the debate they were exposed, through their own folly. It was made clear that the object of the general strike was to try to force the continuation of the subsidy to the miners. It was not to make the employers do something, seeing that they were not in a position to provide a subsidy; but the action was taken because the General Council believed that, by the pressure they could exert through the general strike, they could compel the Government to insist on Parliament continuing the subsidy. "If," said Sir John Simon, "it is contended that the action taken for this purpose is within the law of the land, then that is not what has hitherto been understood to be within the exercise of trade-union rights. It is a perfectly plain attempt to substitute the will and decision of a great and powerful body outside this House for the free and deliberate decision of the House itself. . . . I am no more willing to see the policy of this country decided by a Committee of trade unions outside this House, than I am by a Committee of landlords outside this House." To denounce the Government because they announce that they intend to introduce a Bill to make that plain beyond all question is, to say the least, very unreasonable. It is to obviate the abuse of trade union power that the Government have in view the clarifying of the existing law. The question is now before the country, Which is to be supreme—the nation (through their elected representatives) or labour revolutionaries? There is but one answer.

Is this the Lowest Industrial Price?

The Sheffield Gas Company have announced large concessions in prices to the consumers as from the March meter readings; and it is believed that the industrial concerns with large consumptions in the supply area will be receiving gas at a lower price than anywhere else in England. From cheap supply to the local industries, the whole community must indirectly benefit. It is not claimed that the ordinary consumers will be paying the lowest price in the country. In their case, for gas supplied in quantities up to 500 therms, 7⅞d. per therm will be charged. The charge for any excess beyond 500 up to 2500 therms will be 5d. per therm; for excess beyond 2500 therms up to 15,000 therms, 5⅜d. per therm; for excess beyond 15,000 therms up to 30,000 therms, 5⅛d. per therm; and for excess beyond 30,000 therms 3 d. per therm. This scale gives the largest industrial consumers more than double the quantity of potential heat for equal price per therm compared with the small domestic consumer, which, of course, is right, having regard to the incidence of the consumption and the economies effected by considerable and constant supplies through single service-pipes and meters.

Foreign Coal and British Miners.

Labour-Socialists in the House are very much concerned about the importation of foreign coal, which is affecting the consumption of the British produce, and therefore the number of men employed in the mines. They pretend to be oblivious of the fact that the continued importation of coal from abroad is one of the effects of the work of the Miners' Federation last year; and it is upon the Executive of that body that blame must be laid. A few days ago, Mr. T. Williams, the Labour-Socialist member for the Don Valley, asked the President of the Board of Trade (Sir P. Cunliffe-Lister) if, in view of the large amount of unemployment among miners, something could be done to stop the further importation of foreign coal. Naturally, the reply was in the negative. It is quite impossible. The coal which is now coming in—but which is a diminishing quantity—is simply due to the forward contracts which were placed by industries when British coal could not be obtained in this country, and when it was necessary to safeguard their interests. The Labour-Socialists may be sure that the price which is being paid for foreign coal delivered will ensure that there will be no further buying abroad, so long as British coal is plentiful, and at a reasonable cost. But coal is not the only thing which comes into this country from abroad, and the like of which is produced by British labour.

River Pollution.

There is a movement on foot to produce a more exacting supervision of inland waters and river estuaries, with a view to the prevention of pollution. Recently a deputation, representing societies, boards, and authorities interested in the subject, waited upon the Lord President of Council (the Earl of Balfour). From statements made by Lord Gainford and others, it appears that the organizations and authorities concerned are convinced that pollution is increasing, that the health and well-being of the community is in consequence suffering, and that fish life is being destroyed. The remedy they suggest is that the Government should create a National Co-ordinating Authority, with powers to set up River or Watershed Boards for all rivers in England and Wales, and to act as friends and advisers to all interests to secure the end sought. But, as the Lord President pointed out, no one person in the deputation defined the precise powers which are to be given to such authority, or what relation it should bear to the present organization of the Government, and to the duties of the Ministry of Health. Also to what degree should its action, in reserving water and purifying it, override other possible conflicting interests. The proposal that the suggested Central Authority should co-ordinate and advise is by no means all that is required. The need for new knowledge is fundamental to all such action. Lord Balfour is persuaded that it is absolutely necessary to get the best scientific brains in the country to work on the big problems which lie behind all these troubles regarding the pollution of inland waters; and this the Government are anxious to do. Science is the only path by which there can be any issue from the present apparent impasse; but scientific research is a long business. Some time must be occupied by the researches; but the Government would be prepared to find the financial resources for investigations to be carried out. In the opinion of Lord Balfour, the best scientific research, before it can come into practical use, requires not merely laboratory experiments, but large-scale manufacturing ones, which might require the co-operation of all the interests most nearly affected. With that the gas industry can agree.

Efficiency in Industry.

In 1924, the Rt. Hon. J. Ramsay MacDonald, who was then Prime Minister, appointed a Committee on Industry and Trade, with Sir Arthur Balfour as Chairman, to inquire into the conditions and prospects of British industry and commerce, with special reference to the export trade. The reference set the Committee to work on a matter which has practically no bounds, and which was inevitably a task of years. The Committee have issued three reports. The first two dealt respectively with overseas markets and industrial relations, and were highly valuable. The third report, which has just been issued, is a review of industrial and commercial efficiency; and in this most industries will be particularly interested. The factors in efficiency which the Committee found convenient to deal with are roughly placed under four heads: (1) Factors affecting industrial structure; (2) factors affecting quality of production; (3) factors arising from the relation of the State and public authorities to industry and trade; and (4) certain aspects of the question of industrial profits, burdens, and costs. The volume is a large one, and, in view of this, does not lend itself to any brief review. But it may be indicated that the Committee find that, against the proved advantages of mass production in the reduction of costs and prices, there has to be set certain special difficulties of industrial control, and of a possible weakening of the personal touch which arises from any great enlargement of business. Combinations in industry and trade are growing here. They have been a feature of American and German industry and commerce for a long time past. As is well known, at first such combinations received a considerable amount of popular hostility; but it is found by the Committee that in America there is now a recognition that they do make for greater efficiency. Thus hostility is being

undermined. The Committee also deal somewhat extensively with training and recruitment for industry, which they term "the crucial problem of creating skill," which is an excellent description. The question of training, and so creating skill, is being dealt with in this country, but, it has to be confessed, not to the extent that is found in the countries of our great trade rivals. This is distinctly a matter which requires looking into, with the view of bringing about more intimate relationships between our industries and educational authorities.

Industrial Research.

In this report we are again confronted by the fact that in this country we spend less on scientific research than is done in either America or Germany. The United States, the Committee say, spend annually something like 72 million dollars on industrial research, and annually American manufacturers expend in laboratory research approximately 35 million dollars. The well-worn fact that the chemical and dye manufacturers of Germany employ hundreds of chemists on pure scientific research is again brought forward. The evidence before the Committee showed that the British Dyestuffs Corporation carry on a considerable amount of research; but only a small proportion of it is concerned with fundamentals. The work of the British Department of Scientific and Industrial Research is also alluded to; but in regard to the 26 research associations formed by various industries in collaboration with the Department, the Committee state that the results have been for the most part rather of educational value than of a kind which may be assessed in terms of actual monetary saving or gain, though such saving and gain have undoubtedly been achieved.

PERSONAL.

His Majesty the King held an investiture at Buckingham Palace last Friday. Twenty-eight of the knights bachelor whose names appeared in the New Year's Honours List attended and received the accolade; among them the Governor of the Gas Light and Coke Company and President of the National Gas Council—now Sir David Milne-Watson.

Mr. A. S. Clark, for many years Secretary and Contracts Manager of Gas Distribution, Ltd., Nuneaton, has been appointed to a position on the staff of Messrs. E. E. Jeavons & Co., Ltd., Mainlaying Specialists and Engineering Contractors. He will deal particularly with inquiries concerned with high-pressure gas distribution.

OBITUARY.

Sir Frederick Green, K.B.E., who died at Wimbledon Park last Friday, in his 82nd year, was elected a Director of the Commercial Gas Company in 1894, and became Deputy Chairman two years ago. His wide knowledge of commercial affairs enabled him to render valuable service on the Board. He was knighted in 1912.

The death occurred at his residence at Sunderland, on Saturday, of Colonel Thomas Charles McKenzie, a Director and Vice-Chairman of the Sunderland Gas Company. Colonel McKenzie, who was in his 81st year, was the oldest practising solicitor in Sunderland. He was the son of a former Mayor of the borough, and held many public positions. He was a County Magistrate, a Deputy Lieutenant of Durham County, Chairman of the Wear Fishery Board for 35 years, a member of the River Wear Commission, and for some years a member of the Berwickshire County Council. He celebrated his golden wedding in 1924, and leaves a widow and four daughters.

Utilization of Gas Coke.—A paper on this subject is to be read before the Royal Society of Arts, John Street, Adelphi, on Wednesday evening, March 9, at 8 o'clock, by Dr. E. W. Smith, F.I.C., Technical Director of the Woodall-Duckham Companies. Prof. Arthur Smithells, C.M.G., F.R.S., Director, Salters' Institute of Industrial Chemistry, will preside.

Institution of Chemical Engineers' Examinations.—The Hon. Secretary of the Institution of Chemical Engineers (Prof. J. W. Hinchley) informs us that the examination for the associate-membership of the Institution will be held in June and July next. Particulars of the examinations and the memorandum on "The Training of a Chemical Engineer" may be obtained on application to the Hon. Registrar—Mr. C. S. Garland, Institution of Chemical Engineers, Abbey House, Westminster, London, S.W. 1. We are also asked to state that applications for entry must be received not later than May 1.

FORTHCOMING ENGAGEMENTS.

Feb. 25.—London and Southern District Junior Gas Association.—Meeting at the Westminster Technical Institute. Paper by Mr. E. W. L. Nicol, entitled "Coke's Case."

Feb. 26.—Scottish Junior Gas Association (Western District).—Visit to Messrs. Pott, Cassels, & Williamson's Works, Motherwell.

March 4.—London and Southern District Junior Gas Association.—Twenty-fifth anniversary celebration dinner at the Criterion Restaurant, W. 1.

March 5.—Wales and Monmouthshire Junior Gas Association.—Meeting at Cardiff. Paper by Mr. T. V. Blake on "Some Experiences in Distribution."

March 5.—Midland Junior Gas Association.—Visit to the Stanton Ironworks.

March 8.—Federation of Gas Employers.—Meeting.

March 8.—National Gas Council.—Meeting.

March 9.—Junior Gas Associations.—Education Conference.

March 9.—British Commercial Gas Association.—Meeting of General Committee at No. 28, Grosvenor Gardens, S.W. 1.

March 9.—Royal Society of Arts.—Paper on "The Utilization of Gas Coke," by Dr. E. W. Smith.—John Street, Adelphi, W.C., at 8 o'clock.

March 9, 10.—Institution of Chemical Engineers.—Conference at Burlington House, Piccadilly, W. 1.

March 11.—Institution of Chemical Engineers.—Fifth annual meeting and annual dinner at the Hotel Victoria, Northumberland Avenue, W.C. 2.

March 12.—Scottish Junior Gas Association (Western District).—Meeting at the Royal Technical College, Glasgow. Paper by Mr. Robert Fife, of Kilmarnock, on "Metals Used in Gas-Works Practice."

March 16.—Yorkshire Junior Gas Association.—Joint meeting with the Manchester and District Junior Gas Association. Visit to the works of the Elland Gas Company and to Messrs. R. Dempster & Son.

March 16.—British Commercial Gas Association.—Midlands District Conference at Smethwick.

March 17.—Midland Junior Gas Association.—Meeting in Birmingham. Paper by Mr. A. St. D. Corder.

March 24.—Midland Association of Gas Engineers and Managers.—Visit to the Stanton Ironworks.

March 25.—London and Southern District Junior Gas Association.—Meeting at the Westminster Technical Institute. Short papers by Mr. J. H. Goldsmith and Mr. S. H. Miles.

March 26.—Scottish Junior Gas Association (Eastern District).—Visit to the Dundee Gas-Works.

March 26.—Scottish Junior Gas Association (Western District).—Visit to the Tradeston Gas-Works, Glasgow.

March 30.—Southern Association of Gas Engineers and Managers.—Annual general meeting at the Hotel Cecil, Strand, W.C. 2, at 2.15.

April 1.—British Commercial Gas Association.—North Wales, Cheshire, and Lancashire District Conference at Wallasey.

April 8.—North British Association of Gas Managers.—Annual spring meeting at Dumbarton.

May 5.—Eastern Counties Gas Managers' Association.—Spring meeting at Ipswich.

May 5.—North of England Gas Managers' Association.—Annual meeting at Newcastle.

May 20.—British Commercial Gas Association.—Manchester District Conference at Buxton.

Institution of Gas Engineers.

March 7.—Emergency Committee, Finance Committee, Refractory Materials Joint Committee.

March 8.—Advisory Committee on Education.

June 14-17.—Annual General Meeting in London.

Storage Battery Electromobiles.

Opening a discussion on this subject at a meeting of the Electromobile Association held at the Royal Society of Arts on Feb. 11, Mr. J. C. Elvy said that the management of works possessed of electrical generating plant would be well advised to consider the use of storage battery electromobiles. These, he said, could be charged at little cost during the off-load hours of the generating plant—a system which had proved highly satisfactory in America. He drew attention to the fact that a supply of electricity under the terms of the Electricity Supply Act would be primarily at alternating high pressures, and would have to be converted to direct pressure suitable for battery charging. He stated that much of the success of electromobiles in America has been due to the availability of low-pressure direct current electricity supplies at frequent points in the principal towns; and he urged that good battery charging and renewals garage stations of appreciable size should be situated in all towns and cities, with auxiliaries at suburban garages and interconnecting roadways. In his opinion, it is a pity that this form of transport is so neglected in this country. He said that the Electromobile Association welcomes the enrolment of all who are in possession of direct pressure electrical generating equipment, and he includes gas-works in this scheme.

ELECTRICITY SUPPLY MEMORANDA.

THE electrical campaign for "Wiring the Homes of Britain" does not appear to be impeding the progress of the gas industry. At the same time, from the advertising point of view, the demonstration houses which have been, and are being, furnished in various areas by the combined enterprise of the local electrical contractors and the electricity supply undertakings are proving attractive to the public. There is no question the British public do like a free show; and we say this without any intention to depreciate the value of the houses from the business point of view. From many quarters, the report has come that the number of visitors they have attracted has been good; the figures we have seen varying between 300 to 1000 per day in different districts. But, of course, the number varies from day to day according to the state of the weather. One electrical optimist asserts that, from experience to date with one of these houses, on an average 75 p.ct. of the visitors may be looked upon as potential consumers. If this is the case, then the sooner the Government electricity generation and transmission scheme is hurried forward, the better for the comfort of the electricity industry. It is noticed that much advertising is being done in connection with these demonstration houses, and, in some cases, of a spectacular nature. For instance, at Bath, we read, large notices have been posted throughout the city, lantern slides are being displayed in the cinemas, the street of the city in which the demonstration house is situated is strung with striplight, and the house itself is flood-lighted. All these things are attractive, and so serve their purpose; but, after all, demonstration of the kind is no assurance of efficiency, economy, and reliability in service, which are the main factors in a householder's preference. Regarding the question of the cost of running these demonstration houses, one of our contemporaries states that they can be operated very cheaply. It quotes figures, provided by the Electrical Development Association, which show that five houses in various parts of the country attracted 38,000 visitors, at a total cost of £383, which works out at less than 2½d. per person. The lowest expenditure in the examples quoted was at Manchester, where £10 was spent to obtain 3000 visitors; while at the other end of the scale, comes Edinburgh with an attendance of 20,000 for an outlay of £256. Manchester should explain for the general edification how it managed to obtain so much publicity at such a low figure. Great energy is being shown in the North-East Coast area, where it is reported that some 40,000 competition booklets have been distributed, including 14,000 in Newcastle alone. Competitions are also being conducted among school children in South Shields, Durham, Blyth, Newcastle, West Hartlepool, Darlington, Bishop Auckland, and Whitley Bay. In the same area demonstration houses are springing up like mushrooms—that is, accepting the reports which appear in the electrical press.

Demonstration Houses.

Salaries of the Board.

The Central Electricity Board having been completed, the Minister of Transport (Lieut.-Col. Wilfrid Ashley) announced in the House last week the salaries which it has been arranged shall attach to the offices. The Chairman of the Board (Sir Andrew Rae Duncan) is to get £7000 a year; and the other members, £750 each. Of course, Sir Andrew is to give his full time to the work, for a remuneration which is £2000 in excess of that of the Prime Minister, equal to that of the Attorney-General, and only £3000 below that of the Lord High Chancellor. There are, in addition to the Chairman, seven members of the Board: Sir James Devonshire, Mr. Frank Hodges, Sir James Lithgow, Alderman W. Walker (Manchester), Sir Duncan Watson, Mr. W. K. Whigham, and Brevet-Colonel the Hon. Vernon Willey. Thus the salaries of the Board will total to £12,250; and, superimposed, will be the office, staff, and general expenses of the Board.

Bulk Supply Prices.

When the Central Board get into working stride, they will have to see that the Act of last session is duly complied with in respect of the charges for bulk supply to authorized distributors. It is likely they will find it a complex matter to determine what are fair prices in the great variety of circumstances that will obtain. The technical men associated with most undertakings are convinced that, with development, their own generating costs would be less than they are now; and they are rather apprehensive they will not do so well under the scheme as they could do for themselves and their customers. This will be a difficult and awkward position with which to deal. It will require much diplomacy and accountancy to settle differences of opinion; and there is certainty that the selected stations will be put on their mettle to generate at a cost which will permit the supply to other areas at prices not more than, or below, those at which they could generate locally. The responsibility of determination will rest upon the Board, and yet they will have to see that a balance between outgoings and income for generation is effected. Their job is not to be envied; and, forsooth, they will deserve their pay. There have in the past year or two been cases in which local electricity authorities have found, when compelled by the Electricity Commissioners to give up plans for the extension of their own generating plants, that the price of current delivered from power undertakings is above their own generating cost; and this has given rise to discontent and bad feeling. The Middlesbrough Gas and Electricity Committee recently approached the Commissioners for authority to construct a power station at a cost of £140,000, being convinced that they could do better in regard to price than the Cleveland and Durham Electric Power Company, with whom the Corporation have had a contract. At an inquiry into the matter, the Company did not call any evidence, so that the Corporation were denied the opportunity of cross-examining upon the question of charges. Sir Joseph Calvert has stated in the Town Council that, to have accepted the Company's offer would, on the basis of 13,000,000 units, have made an immediate difference of £9000 a year to the consumers; and subsequently the additional cost would reach £19,000. The Company have amended their offer; but this, it is said, would only make a difference of between £2000 and £3000 a year. The Committee are now awaiting the decision of the Commissioners; but they are also open to further negotiation with the Company.

All-Electric Public Lighting.

A short time ago we referred to the collection made by the "Electrical Times" of the names of a comparatively few towns in the country which have adopted electric lighting for street purposes to the total exclusion of gas. In our comments on the subject, we invited our contemporary to say how many of the administrative bodies of these towns are in possession of the electricity undertaking; how many of them, too, are in competition with private gas enterprise, and deliberately override fair and economic competition. "Meteor," referring to this, remarks: "The 'GAS JOURNAL' recently was commenting upon our failure to answer a certain challenge that it threw down. We simply did not see the challenge in question." But even now that our electrical friend has seen it, he apparently does not relish the task of accepting it, and giving a reply to our inquiries. He simply evades them by saying: "The days when gas was a dangerous lighting agent have passed. The public no longer have any doubt." That is a very simple line of evasion. It is perfectly obvious why "Meteor" refuses to reply to our questions. He knows as well as we do that, in many of the cases where gas has been evicted, and electric light has been put in its place, it is due not to public economy and efficiency, but solely to the possession of the electricity supply, and the desire to give as much business as possible to the electricity undertaking. And speaking of efficiency, we will ask "Meteor" whether he can give us the number of failures of electric street lighting (say) during 1926, as compared with the number of failures of lighting the streets by gas, because it is our contention that the lighting of the streets, in view of the considerable number of street accidents which occur, and the need for light for the maintenance of law and order, should be by the most reliable means available; and we submit that experience shows electricity is not the most dependable agent.

Coloured Hot Water.

A matter of some interest in connection with the appliances provided by our electrical friends for water heating was the subject of remark in the "Memoranda" for Feb. 2, under the heading "Electricity and Hot Water Supply." The question was raised by a correspondent of the "Electrical Times"—Mr. F. C. Dain, of Blackburn—as to why it was, with his electric water-heater, the water became discoloured, and the discoloration increased as larger quantities of water were drawn-off, which, of course, means that the nearer the water is drawn from the bottom of the cistern, the greater the discoloration. Mr. Dain sought some elucidation of the matter; and it was suggested by us that, if Blackburn is receiving water drawn from moorland areas, the acid content might be somewhat high, and affect the metal of which his electrically heated water cistern is constructed. Another correspondent subsequently wrote to our contemporary also suggesting that the chemical constitution of the water has something to do with the discoloration to which attention has been drawn. He says: "I venture to suggest that the presence of rusty sediment in the water clearly shows that the hot water container of the water-heater referred to is of iron, and not of tinned copper, as it should be to withstand the action of the vegetable acids found in soft water. I think you will find that the water supply at Blackburn is soft, in common with other Lancashire and Yorkshire towns drawing their water supplies from moorland districts." He also suggests that the trouble is possibly aggravated by the presence of peaty substances in suspension in the water.

Revelation from Investigation.

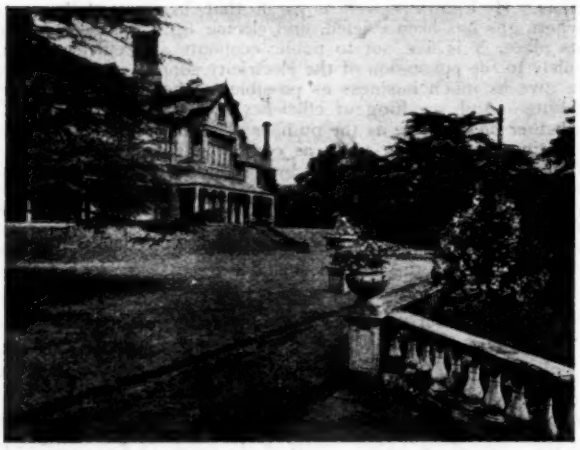
These suggestions have proved to be true. Mr. Dain has made experimental investigation, with results which he describes in a letter to the "Electrical Times." First, he disconnected the cold water feed inlet of his heater; and the water was found to be perfectly clear and with no trace of sediment. Reconnecting the feed, a thermometer was held under the discharge flow, and a steady temperature was maintained for about the first 6 gallons; then (this is interesting) the temperature gradually fell with each succeeding gallon, until the tenth gallon was practically cold, and of a deeper rust colour than usual. A further 6 or 8 gallons were run off without any noticeable change. Having emptied and dismantled the heater (no easy task on one's own), it was found that the only apparent method of ingress to the container was by the removal of eight pins, which allowed the lid of the heater to be taken off, disclosing a packing of fine cork, 2 in. thick, surrounding the container, which, by means of a file and magnet was proved to be of iron with a galvanized exterior. On examination of the element (which was of the immersion type), it was found to be completely covered with a coating of red sediment, together with the bottom of the tank and to a lesser degree the sides. There is no doubt this sediment was pure rust—proving the advisability of a container of other metal than iron with water of the composition of that at Blackburn.

Fires on Electrical Installations.

This paragraph is taken without comment from the "Electrical Review:" "In order to secure closer co-operation between the fire brigade and the electrical power station in the event of fires affecting electrical installations, the German Association of Electro-Technicians has issued instructions under which all the important distributing stations must have trained men who can be sent at the request of the fire brigade to the place where the fire occurs. On the other hand, the fire brigade must have special electricians trained by the electrical authorities to carry out electrical work. The use of electric lighting in fire fighting is advocated, as it serves its purpose in smoke-filled rooms and facilitates rescue work. Only non-conducting extinguishers, driven by non-conducting means, may be used; and in case of wooden poles catching fire, when water has to be used, the electrical conductors must be made dead before extinguishing the fire, to avoid the risk of electric shock from the stream of water. When the work is over, all parts of the undertaking affected by the fire must be completely cut-off before anyone is allowed to enter."

THE HOME OF THE LATE RT. HON. SIR DANIEL FORD GODDARD.

The Editor of the "JOURNAL" has been asked by the Institute of Journalists (of which he is a Fellow) to take part in obtaining contributions to an Endowment Fund for the home for convalescent and veteran journalists at Oak Hill, Ipswich. This beautiful estate of some 21 acres, with the mansion, was till his death the home of the Rt. Hon. Sir Daniel Ford Goddard, M.P., who was so intimately associated with the gas industry—first as the Engineer of the Ipswich Gas Company; and, subsequently, as Chairman of that Company, the Tottenham District Light, Heat, and Power Company, and the South African Lighting Association. He was also a Director of the Gas Light and Coke Company and the Bournemouth Gas and Water Company. The munificent gift of the estate and mansion has been made to the Institute by Councillor Parkington,



Oak Hill.

of Ipswich. It will be very valuable to journalists who have broken down in health, or who have attained to years which disable them from pursuing their vocation; but naturally it will require a considerable fund in order to support the good work.

While the Editor does not make a general appeal to the gas industry, it may be that some of the gas undertakings with which Sir Daniel Ford Goddard was associated, or his personal friends in the industry, would like to be identified, through a monetary contribution, with the good work which will be carried on in the home of their late friend. Should this be the case, acknowledgment will be made of the contributions through the "JOURNAL" columns; and they will be forwarded to the Institute of Journalists, to whom the Editor prefers cheques should be made payable. Most gas men knew of the work for the gas industry of Sir Daniel Goddard both inside and outside the Houses of Parliament. Many also knew him personally, and not a few had the pleasure of visiting him in his beautiful home, which is now being devoted to such a deserving object.

STANDING COMMITTEE ON COAL TRANSPORT.

Sir Arthur Duckham the Chairman.

The Minister of Transport and the Secretary of Mines announce that a Committee has been appointed, to be known as the Standing Committee on Mineral Transport. The purpose of this body is to review the equipment available in connection with the transport of coal from the fields to the ports and internal markets of the country, and the methods of conducting such transport, with special reference to the recommendations of the Royal Commission on the Coal Industry. The Committee are also to devise such means of promoting improvements in the equipment and its use as will lead to the greatest efficiency and economy in transport, and be of mutual advantage to the coal-mining industry and the transport agencies. They are also directed to report on the steps to be taken, and any further measures necessary from time to time, to bring about desirable alterations, and generally to watch over this matter and the progressive realization of the economies and improvements which the report of the Royal Commission considers possible. The Chairman of the Committee is Sir Arthur M. Duckham, who (besides being the Chairman of the Woodall-Duckham Companies) has a splendid record in public service. It is a large Committee, consisting of seventeen members, in addition to the Chairman. The railway and transport services are represented on both employer and employee sides. The interests of coal mining, selling, and exporting are also well in evidence. The railway wagon industry and docks and harbours have their affairs in the hands of men of special experience. It is a comprehensive body. Mr. W. D. Duffield, of the Ministry of Transport, and Mr. F. C. Starling, of the Mines Department, will act as Joint Secretaries. Communications are to be addressed to the Joint Secretaries, Standing Committee on Mineral Transport, 7, Whitehall Gardens, S.W. 1.

Coke-Oven Developments in Germany.—Industrial activity in Germany was most marked during last year; and it is interesting to note that great progress has been made in the direction of large chamber regenerative ovens and bye-product plants. One firm, Dr. C. Otto & Co., of Dahlhausen-on-Ruhr, have booked during the last few months orders for no less than five extensive plants in Germany and one in Russia—total 310 ovens. The Otto Company have had installed for some time past a demonstration plant, consisting of five full-sized ovens, combination type, with complete bye-product plant, at their works at Dahlhausen-on-Ruhr. This plant is working continuously under the direction of the most experienced engineers and chemists of the firm; and remarkable results have been obtained in coking speed and large output of high-quality uniform coke. These achievements in the main have been obtained through the heating of the coke oven walls being absolutely under control; and the temperature in the vertical and horizontal direction of the walls is so even that the present-day necessary evil of tapered chambers or a set-off of the runners is quite unnecessary. We are informed that the Otto Company will be pleased to undertake complete coking tests, free of cost, and on a large scale, for any British undertaking raising coking coal. In this connection, the Otto Company have affiliated themselves with Silica Coke Oven and Machinery, Ltd., of Aldwych House, Aldwych, London, W.C. 2, where further particulars can be obtained.

INSPECTION AND MAINTENANCE OF CONSUMERS' APPLIANCES.

JOINT CONFERENCE OF THE BRITISH COMMERCIAL GAS ASSOCIATION AND THE INSTITUTION OF GAS ENGINEERS.

Resolution Unanimously Adopted that an Efficient System is Essential to the Gas Industry.

THERE was a large attendance at the keenly anticipated Joint Conference of the British Commercial Gas Association and the Institution of Gas Engineers on the important subject of "The Inspection and Maintenance of Consumers' Appliances," which was held on Wednesday last, in the theatre of the Institution of Mechanical Engineers, Storey's Gate, Westminster. There were sessions in both morning and afternoon; and at the end of four hours' debate, the discussion was only brought to a close through the effluxion of time. The following is a report of the main points raised by the various speakers. In the Chair was Mr. JOHN E. COWEN, J.P., the Chairman of the Newcastle-on-Tyne and Gateshead Gas Company (of whose qualifications to conduct such a conference successfully, those who had had the privilege of attending the last annual gathering of the "B.C.G.A," under his Presidency, were already well aware). On the platform supporting him were Mr. F. W. Goodenough (Executive Chairman of the "B.C.G.A."), Mr. John Wilkinson (President of the Institution of Gas Engineers), Mr. H. D. Madden (Vice-President of the Institution), Mr. C. F. Botley (Immediate Past President of the Institution), Mr. E. J. Fottrell (Joint Manager of the National Gas Council), Mr. W. E. Price (Hon. Secretary of the Institution), Mr. W J. Sandeman (of Croydon), Mr. J. W. McLusky (of Glasgow), Mr. W M. Mason (Manager of the "B.C G A."), and Mr. Walter T. Dunn (Secretary of the Institution).

The resolution which was unanimously passed at the morning session, on the proposition of Mr. F. W. GOODENOUGH, seconded by Mr. W. J. SANDEMAN, was in these terms:

That in the opinion of this Conference an efficient system of periodical inspection and maintenance of the gas appliances in all consumers' premises (backed by a constant supply of gas adequate to meet the maximum demand) is essential to the permanent prosperity and future progress of the gas industry, and to the complete fulfilment of its duties to the community; and that to this end every possible facility and encouragement should be given for the education and training of the personnel necessary for carrying out the work entailed.

CHAIRMAN'S OPENING REMARKS.

Mr. J. E. COWEN, in opening the conference, said: While I appreciate the honour of being asked to take the chair at this large, and, I hope, representative, meeting of the gas industry, yet I am cognizant of the responsibility involved by the importance of the subject under discussion; and I could have wished that someone more closely in touch with the details of the work had been asked to preside. As you know, I am not an expert either in gas production or distribution; but at the same time, I fully appreciate the difficulties of those engaged on the detailed technical work of both departments in formulating and carrying out effective schemes of inspection and maintenance suitable to the conditions prevailing in the various undertakings throughout the country. On the other hand, as one who has had some experience in gas administration, and perhaps more experience than many of you in meeting intensive electric competition both from collieries and from a most powerful and efficient electric supply company, I am convinced that, unless by some means we are able to see that the gas we sell, and hope to sell in increasing quantities, is supplied to our customers under the best conditions of quality and pressure, and is used by them in the best and most efficient apparatus working under the best conditions, not only to begin with, but all the time, great opportunities for future business are going to be lost, and great dangers of losing our present business and position are going to be run.

I feel sure Mr. Goodenough was right in what he wrote last month in the "Bulletin," when he used these words: "It is no exaggeration to say that on the adoption of a wise policy respecting the selection, inspection, and maintenance of the appliances used throughout our districts by all our consumers, depends the future progress of the industry. The Electricity Act is meant to be the prelude to, and the instrument for ensuring, a great era of progress in the application of electricity to domestic and industrial problems. It is for every administrator of every gas undertaking to see that the development of that era is not facilitated and forwarded by failure to strengthen their own foundations; but rather that the progress of electricity is attended and preceded by still greater progress on the part of gas, brought about by an enlightened policy of service to the customer."

CONFERENCE PROCEDURE.

I do not propose to detain you by making any long speech. It is my business to preside, and as far as possible to direct the discussion to the best advantage, so that as many points as possible may be dealt with. After the resolution to be submitted has been moved and seconded, I propose that we should discuss the general principle involved. It seems to me, from what I have heard and read on the subject, that there are some who think the policy of universal inspection and maintenance is going too far, and assuming a responsibility which may lead to trouble. This is a most important point for the industry, and it is one with regard to which we ought to bring out everything that can be said both for and against. There seem to be others who think that we should confine our operations in this connection to certain apparatus; and still others there are who feel very dubious about the cost. After these matters have been discussed, there are several important questions of detail which I suggest might be considered separately. First, there is the question of cost—whether this should be included in the price of gas or in the rentals charged for hire and hire purchase, or charged direct to consumers for specific work done. The next point is whether examination prior to maintenance, as is done by the Gas Light and Coke Company, is necessary. Some smaller companies must do differently from the large ones. Then there comes the question of whether one should have specialized men for particular work, or universal men who would go to premises and deal with everything requiring to be done there. Another point is whether men should work in batches all over the area, or whether they should be given fixed districts with definite consumers to visit at each inspection. Further points are the training of men and the periods of inspection.

AN ACKNOWLEDGMENT TO THE "JOURNAL."

Before calling upon Mr. Goodenough to move the resolution on the programme (in doing which he will cover the whole of the ground generally), I should like to take the opportunity of saying that we are very much indebted to the Press generally, and to the "GAS JOURNAL" perhaps in particular, for the

trouble they have taken in regard to this conference, and the publicity they have given to it. The Supplement to the "JOURNAL" of Feb. 2, and the other articles and references to the matter, have helped in a way which I am sure deserves the thanks of the industry. ["Hear, hear."]

STATEMENT BY THE "B.C.G.A." EXECUTIVE CHAIRMAN.

Mr. F. W. GOODENOUGH: Before proceeding to deal with the resolution which it is my privilege to submit, I should like to read you the following

LETTER FROM SIR DAVID MILNE-WATSON, PRESIDENT OF THE NATIONAL GAS COUNCIL.

Feb. 4, 1927.

DEAR SIR,—I am in receipt of your notice relating to the conference to be held on the 16th of February on "The Inspection and Maintenance of Consumers' Appliances."

Representatives of this Company will be attending the conference, the subject of which I regard as of great importance to the whole gas industry; and I should like to express the hope that it may lead to an extension of the policy of thorough service to the consumer upon which the permanent prosperity of the industry so greatly depends.

As I have taken occasion before to press upon the attention of all engaged in it, the popularity of each undertaking amongst its individual customers, based upon efficient and courteous service, is its surest bulwark against the rising tide of competition.

Yours faithfully,
(Signed) DAVID MILNE-WATSON.

J. C. Walker, Esq., Secretary,
British Commercial Gas Association,
28, Grosvenor Gardens, S.W.

That empowers me, as an officer of the Gas Light and Coke Company, as well as Chairman of the Executive of the "B.C.G.A.," to speak whole-heartedly in favour of the resolution. The purpose of this conference is the continuation and crystallization of the several discussions that have taken place during the past year or so at meetings of the Institution of Gas Engineers, the Salesmen's Circles of the "B.C.G.A.," district conferences and the national conference of the "B.C.G.A.," and meetings of District Associations. The object we all have in view in advocating the adoption of inspection and maintenance is the advancement of progressive policy in the industry, to ensure its permanent, progressive prosperity; and the satisfying of the Government authorities that the industry has this important matter under full and active consideration, and is doing everything that can be done to deal adequately with the subject. I should like to remove any apprehension that is in the minds of some managers or administrators in the gas industry that this discussion on inspection and maintenance is a prelude to Government interference with the industry, with a view to imposing upon it any such policy. Quite the contrary. What the conference to-day has in view is to prevent—to render unnecessary—any Government interference on this subject.

THE BUTTERFIELD REPORT.

May I remind you of the origin of the Government's concern with this matter? It first of all arose out of what we may briefly describe as the Press "stunt" on carbon monoxide, in connection with which a report was made by Mr. Butterfield to the Board of Trade. As was impressed upon the Board of Trade in discussions following upon that report, no one is so anxious as those engaged in the gas industry to secure the immunity of the users of gas from risk. No one outside the industry is half so anxious as those in it to reduce fatalities due to the use of gas to the absolute minimum. To us, one fatality is one too many. The Butterfield report attached great importance to inspection and maintenance as a means of increased immunity of the public from accident. The National Gas Council differed absolutely from Mr. Butterfield in regard to his "wide assumptions and sweeping assertions" in this connection. The memorandum they submitted on the point reads:

> The Council differ absolutely from Mr. Butterfield in regard to those wide assumptions and sweeping assertions, for which they submit he has not given any subtantial justification, and for which they believe, from an examination of such data as are available, no justification exists.
>
> They agree that it is desirable that only gas piping, fittings, and appliances of a proper character should be installed by or for consumers in their premises, and desire to point out that a great many gas undertakings already do all in their power to ensure that this is done. They agree that water-slide chandeliers and unventilated geysers should be eliminated, and desire to point out that for a long time they have been generally condemned by the industry. They agree that inspection, as already practised by many gas undertakings, is desirable as a matter of good service to the consumer; but they are of opinion that such inspection could do very little to diminish the present low rate of purely accidental death from gas poisoning, and that high expectations of beneficent results to be secured by that means are unfortunately destined to fail of fulfilment.
>
> The Council submit that there are no grounds for the suggestion that a material reduction in accidents would have been effected in the past, and could be effected in the future, by any system of selection, inspection, and maintenance of the pipes, fittings, and appliances installed or to be installed in consumers' premises.

The National Gas Council, however, gave an undertaking to the Board of Trade, in respect to the recommendations contained in the report:

> To submit to the Board of Trade suggestions for the provision of inspection where not already made by gas undertakings of the gas piping, fittings, and appliances in dwelling houses so far as practicable, having regard to the inaccessibility of most gas piping, and to the impossibility of discovering in gas fittings and appliances by inspection latent defects, or defects due to cumulative wear, that may subsequently develop.
>
> To invite the makers of gas fittings and appliances in this country to confer with the Council with a view to submitting to the Board of Trade effective proposals, if such can be devised, for discouraging (and, if possible, preventing) the sale of undesirable types and qualities of fittings and appliances and the fixing of geysers and similar appliances without adequate and trustworthy means of ventilation; it being borne in mind that a great many gas fittings and appliances are not supplied by gas undertakings, but by firms over whom they have no supervision or control.

Now, the "B.C.G.A." and the Institution of Gas Engineers are the commercial and technical branches of the industry who have the duty of implementing the undertaking given by the National Gas Council. The National Gas Council have a Safety Committee; and the "B.C.G.A." are recommending this Committee to consider the advisability of setting up a permanent Vigilance Committee, to whom would be entrusted the task of calling the attention of makers and suppliers of unsatisfactory appliances and fittings to the objections that can be urged against them, and of trying to bring pressure to bear upon firms to prevent the advertising and sale of such undesirable goods. But the best way of all, in my opinion, to eliminate shoddy and unsatisfactory fittings and appliances is for us all to establish the closest possible relations with, and to secure the utmost confidence of, our consumers. In this way, we can advise them as to appliances which are unsatisfactory. The Board of Trade want the industry to solve the problems of inspection and maintenance for itself. They do not desire legislation, or to interfere with us in any way. They only want to be sure that we are dealing with the matter in as practical and thorough a way as possible. It is up to the industry to show that they deserve the confidence of the Board of Trade, and are tackling the problems actively and adequately. That is why we are here to-day.

QUESTION OF RESPONSIBILITY.

I should like to read another letter which we have received from a gas engineer:

> I cannot be present on the 16th inst., but trust prominence will be given to the following.
>
> If companies are required to inspect appliances, a very grave responsibility is placed upon them, necessitating heavy insurance against third-party risk. The inspections would be wholesale, and we know how perfunctory such inspections are apt to become.
>
> We would often be inspecting and approving work done by local ironmongers, and so assuming responsibility for explosions, poisonings, &c., resulting from undetected defects which only a very crucial examination would have discovered.
>
> I am quite in favour of maintenance; but power to inspect would become a duty involving too serious liabilities.

I do not know that anyone is proposing that we should seek any powers in the matter. I think every gas undertaking has all the powers it needs to give service to its consumers; and I have no fear of responsibility that will ensue, but I should like to say something more on that point presently.

PURPOSE IN VIEW.

What is our purpose in instituting inspection and maintenance? It is, in the first place, to secure the maximum satisfaction of the customer, from the points of view of safety, suitability, appearance, and efficiency of all the means of consuming gas that he may have on his premises. But the satisfaction of the consumer, I suggest to you, is not sufficient; it must also be the satisfaction of the gas undertaking, which knows far more about what is or is not satisfactory than the consumer, in 99 p.ct. of cases. I have come across schemes of inspection and maintenance that have been worse than useless, because they have put the undertaking into the position of being in a "fool's paradise," thinking they were doing what they were not doing. I have come across systems that have been worked in this way: The company's representative knocks at the door. He sees either the consumer or, much more frequently, someone representing the consumer, and asks: "Are you satisfied with everything connected with gas in your house?" If the reply is: "Oh, yes," the representative says: "Thank you; good day." This is regarded as a system of inspection and maintenance; while, of course, it is nothing of the sort. It is only by a gas expert obtaining admission to the premises and examining the equipment that the undertaking can be satisfied that everything is as it should be. You know perfectly well that if you go over the premises of a consumer who thinks he is getting the best results that can be secured from the apparatus in use, you frequently find something or other far from what it should be. The aim of inspection and maintenance should be to satisfy yourself that the consumer is

really getting the best results. We know by experience that if you do that you obtain the confidence and goodwill of your customers in a way and to a degree that would be quite impossible by any other means. Thus you secure retention of existing business. You make it difficult for a competitor to take away the business you have; and you know when you are threatened with loss of custom, instead of only finding out when the business has been lost. Further, you obtain the greatest possible extension of business both at the moment and in the future.

Be Commercial Gas Authorities.

Now, to get right down to the fundamentals of business. Is it not true to say that we get the most business from our friends, and not from people we have neglected, annoyed, or quarrelled with? If you were starting business, the first people you would expect to deal with you would be your friends. So if you want your business to be as progressive as possible, you will ensure that the largest possible proportion of your customers are your friends. That sounds like talking the very "A B C" of commerce—like "teaching your grandmother to suck eggs." But I want to say quite plainly that we have sufficient experience at the headquarters of the "B.C.G.A." to know that there are administrators and managers of gas undertakings to-day who have not begun to learn the "A B C" of commerce—who have not realized they are in commerce. They have not begun to think about "sucking eggs." They are still in the atmosphere of the professional engineer engaged in manufacturing gas, which people will come and take if they want it, and for which no responsibility is accepted beyond the works. Of course, that is a remark addressed, I am quite sure, to nobody here to-day, because this is a conference of progressive men in the industry. But, as Mr. Cowen has said, the Press has already done great work for us in connection with this conference, and it will be doing further great work by reporting the proceedings here; and we hope this report will reach some of the by no means few gas undertakings whose administrators and managers still have not realized that they are engaged in the ordinary business of selling a commodity to customers whom they have got to satisfy, if they are to be successful and to make the progress they could and should. To meet modern conditions, we must have modern ideas and modern methods. Now, to show you that I am not "talking through my hat," let me read you two letters we recently received at Grosvenor Gardens. The first is as follows:

> Having tried every other method, my last resort is to write to your Association, and complain of the treatment of their customers of the — Gas Company.
>
> I have a defective meter installed in my house, and have asked the Company to repair it or have it removed. Apparently, because the meter works to their benefit, the Company steadily refuse to do anything, and ignore all communications and complaints.
>
> I may mention that the Electricity Company here is "romping home" on all sides because of the inactivity of the local Gas Company; and I myself would use it were the cables extended to my house.

We sent a copy of that letter to the Gas Manager in question, asking him what he would like us to reply to the consumer; and his answer was:

> I thank you for yours of yesterday's date, enclosing copy of a letter you have received from one of our consumers.
>
> If you have acknowledged his letter, I suggest there is no need to do anything further. Neither your Association nor my Company would gain anything by either the crediting or taking any notice of his communication.

Is it not amazing that, in the year 1927, any gas manager should write a letter like that? But that is by no means the only gas company who deal with customers in that way, as we know at headquarters; and I do beg of the gas industry in every corner of the land to wake up to the fact that business methods have got to be adopted by every gas undertaking, because those concerns who are dealing with their public in that way are damaging all of us. That undertaking is situated not 50 miles from London. It is not very far from Mr. Sandeman's district; and he and all of us are suffering from the inefficiency of the service in that district. Our system of inspection and maintenance must be thorough; there must be no half measures.

The Bogey of Inspection.

Now, what about that bogey of responsibility? A quarter of a century ago, a great many gas managers and administrators were afraid of ever setting foot inside a consumer's house and doing anything; but there have been 4¾ million slot supplies put in during the intervening 25 years, and we are responsible for giving proper attention to every one of them. What terrible results have accrued? We are doing installation work—most of us plenty of it. In the case of my own Company, we did work for customers last year to the value of £750,000, in round figures. What about the responsibility for all that installation work? But if you do your work properly, there is no such terrible responsibility as some people are worrying about. There is no responsibility where there is no negligence. In our district some time ago, three or four days after we had inspected the installation in an ordinary consumer's house, the down-rod of a pendant split. There was a serious escape of gas, a bad explosion, and an old man of eighty died of shock from the explosion. The letter from us to the consumer offering the services of our representative for inspection and maintenance was produced to the Coroner; and the question was raised whether we could and should have discovered the possibility of this escape and prevented the accident. The pendant was produced in court; and the Jury agreed that it was impossible for anyone before it split to discover there was any danger of its doing so. The Coroner said he congratulated the people of the district on being supplied by a Gas Company who had sufficient regard for their interests to employ men to go round and inspect their fittings and appliances, in order to see that they were efficient and satisfactory. He practically "handed us a bouquet" for our maintenance scheme; and the Jury brought in a unanimous verdict, without direction from him, of "Accidental death." There was as clear a case as one could have of an accident happening within a short period of inspection of a consumer's premises. As I said before, if there is no negligence there is no responsibility; and experience of many years shows that there is no risk in carrying out these installation and maintenance services for consumers in any way comparable with the risk to the industry that they would incur through neglecting their responsibilities and their duties—and the opportunities which inspection and maintenance afford. ["Hear, hear."] Are we to do nothing to point out to a consumer that he has apparatus which is not safe or suitable? Are we to hide ourselves, and never know, though we shrewdly suspect, that our consumers have undesirable appliances or appliances wrongly installed or badly chosen, which we ought to recommend them to remove or to tell them how to fix? Are we to "pass by on the other side" and leave our consumers to the consequences of our indifference? What about the consequences to our reputation? There are any amount of rank bad advertisements waiting to be cleared away. The standard of taste and efficiency in gas appliances has been steadily rising of recent years; and it is up to us who know to see that the consumers have the up-to-date and the efficient. This will lead to increased business right away. We know that from practical experience on a large scale. We are continually getting additional business as the result of our inspection scheme. The results we are obtaining from that scheme are quite remarkable. The census we take gives us information as to where business can be most profitably sought. In the month of February, which is not the best time for effecting gas fire business, we started to tackle a part of our district containing houses where there were no gas fires in use; and one man brought back in one day orders for fifteen gas fires from three houses no one of which had ever used gas fires before. The information came from our inspection and census; and the business followed.

Question of Cost.

The Chairman has referred to the question of cost. This, of course, depends upon the system adopted; and a system applicable to one particular district may not be applicable to another. Corporations have different conditions to deal with from companies; and no one of us is qualified or desirous to dictate to others what they should do, or to suggest that any one scheme is preferable for them to another. We can all learn from each other. To anyone who is fearsome as to cost, I would say: "Try a scheme out first on a small scale; and you will find it pays handsomely."

Employ Suitable Men.

There is one other point of great importance, and that is to employ the right people to do the work. ["Hear, hear."] That is why more and more education and training in the industry are becoming of the greatest urgency; and, as Chairman of the Education Committee of the industry, I do ask the senior men to give the fullest possible consideration to the question of the education of the younger men. See that they get all the opportunities and facilities that may be practicable, to enable them to secure the education and training necessary to make them the men you want.

The Enemy is at the Gate.

The Chairman referred to the Electricity Act. Yes, it is true; the enemy is at the gate. But there is a great difference between the organization of the electrical industry and of our industry, in connection with the matter we are considering, which can be a very great source of strength to us. In the electrical industry, the suppliers of current in practically no case take any responsibility beyond the meter. They do not to any considerable extent supply or fix apparatus; they leave that to the private tradesman. We as an industry have largely, except in the case of many municipal undertakings, adopted an opposite policy, which will be a great source of strength to us in meeting competition, provided we do not make it a great source of weakness by neglect. The opportunity is ours to-day; but, as I have said, the enemy is at the gate, and everything will depend as to how far he succeeds or fails in invading our citadel, upon whether we adopt a policy of courage, foresight, imagination, faith, and efficiency, or whether we are blind, timid, and incompetent. I am quite sure that an un-

precedented progress in development awaits us if we grasp our opportunity with both hands, and do not let it slip through fumbling and nerveless fingers. I am able to speak with the greater freedom in this matter, because I am only voicing the opinions and the policy of the Company I have the honour to serve. The Governor and Directors of the Gas Light and Coke Company are "whole-hoggers" for the greatest service to consumers, from meter to burner tip, at all times. It is now my pleasure to move:

> That in the opinion of this conference an efficient system of periodical inspection and maintenance of the gas appliances in all consumers' premises (backed by a constant supply of gas adequate to meet the maximum demand) is essential to the permanent prosperity and future progress of the gas industry, and to the complete fulfilment of its duties to the community; and that to this end every possible facility and encouragement should be given for the education and training of the personnel necessary for carrying out the work entailed.

DETAILS OF SYSTEMS IN OPERATION AT CROYDON.

Mr. W. J. SANDEMAN (Croydon): I have very much pleasure in seconding the resolution which has just been submitted, because I am confident that it is not only the moral duty of the industry to keep in a state of high efficiency all gas-consuming appliances, but the surest way of securing what we all covet most—permanent and profitable business. Quite apart from its fundamental purpose, which is commercially sound, the periodical inspection of gas appliances affords an invaluable opportunity of introducing new business and of weeding out obsolete appliances which discredit the industry. Moreover, it offers a practical means of exhibiting the industry's desire, so often expressed, to serve the public efficiently.

Unfortunately, there is still entertained in some quarters grave doubts as to the wisdom of accepting responsibility for apparatus owned by customers, as distinct from apparatus supplied on hire, for which latter, of course, we can scarcely repudiate liability. The question of maintaining privately-owned apparatus may be a controversial one—although I do not think we need have any fears on the matter; but there is clearly no justification for the deplorable fact that even to-day certain undertakings do not trouble to maintain regularly the appliances they supply on hire. I am confident from the experience derived in my district that we have much to gain by the inclusion in our maintenance and inspection schemes of all appliances, irrespective of ownership; for, if a customer is found to be using a piece of apparatus which is unsuitable—and perhaps dangerous—we have an excellent opportunity of replacing it by an appliance which will give satisfaction. At the same time, we avoid the risk of an accident which might do us considerable harm. Failing replacement—and this occasionally happens when the appliance is owned by the customer—we can always protect ourselves by a letter pointing out the danger of continuing its use. Again, it is frequently found that a once perfectly satisfactory appliance is not being used because, as the consumer states, "it has gone wrong," when all that is needed to bring it into use again is cleaning and adjustment.

In Croydon, for years past we have been building up a maintenance organization, and, while we do not consider it complete in every detail or necessarily the best that can be devised, we have so far found it to operate satisfactorily and, I think I can say, economically.

There are two systems under which maintenance of appliances can be covered—viz., specialized and general. Under the "general" system one man maintains the whole of the appliances in a customer's house. This reduces the number of calls and prevents a certain amount of overlapping; but I have yet to be convinced that the work can be so thoroughly carried out as under a specialized system, due to the diversity of the apparatus in use having to be attended to by one man not wholly familiar with every type of appliance met with.

Under the "specialized" system, which is the one we have adopted, separate staffs are employed for the various sections, and the men are specially trained in the maintenance of the particular appliances with which they have to deal.

Our system is perhaps a little more costly than a general system; but I feel that the work is carried out in a more thorough manner, and consequently gives greater satisfaction to the customer.

DETAILS OF SYSTEMS.

Lighting.—For domestic lighting burners, 2d. per burner per visit is charged for labour only. Calls are generally made monthly. With halls, churches, &c., where the installation is over 50 burners, a special labour rate of 1d. per burner obtains. Cluster burners are charged at half the ordinary labour rate. Example: A 4-light lamp (4 No. 2 burners), 4d. per visit. Materials are charged at cost price, *plus* 33⅓ p.ct. In certain cases inclusive contracts (an agreed sum per annum for labour and materials) are entered into. 10,000 consumers out of 62,000 avail themselves of this service; and the number is steadily increasing. 500,000 burners are attended to per annum by 40 men (including two foremen). The average number of burners attended to per man per day varies from 60 to 70.

The service runs throughout the year; 22 p.ct. of the calls made being unproductive—18 p.ct. during the eight months Sept. 1 to April 30, and 26 p.ct. during the four summer months, May 1 to August 30. We are now considering the advisability of eliminating the service during the four months May to August (inclusive). If this is done, the majority of the men employed would be engaged on fire maintenance work during these four months.

Cookers.—So far we have not adopted any scheme for the maintenance of cookers; complaints being attended to on request. The responsibility for keeping cookers clean rests with consumers, in accordance with a special clause in our hire agreement; but we undertake this work, if required, on payment of a fee of 7s. 6d. per visit. The number of consumers who avail themselves of our cooker cleaning service is steadily growing. Cookers are cleaned free for new consumers continuing hire of stoves already fixed. The number of cookers cleaned per man per day varies from two to three.

Fires.—These are examined periodically, not less frequently than every eighteen months. Labour is given gratis both for fires on hire and for those privately owned. Materials are charged for only in the case of the latter. The number of fires attended to per annum is 30,000—most of these being disconnected and refixed. A special grade of labour (fire maintenance men) is employed for the work. There are no mates. The number of fires attended to per man per day averages sixteen.

Geysers.—These are not supplied on simple hire. A large sale business (800 or more per year) is done; the large majority of these geysers being installed under a three years' instalment-purchase agreement. Whether it is bought outright or purchased on deferred payment, our charge for inspecting and cleaning a geyser (usually one visit per year suffices) is 4s. per visit; repairs, &c., extra. The number of geysers attended to per annum is 6000. A special grade of labour (water heater maintenance men) is employed for this work. There are no mates.

Circulating Boilers.—These are supplied on simple hire. The rent is 5s. per quarter, including maintenance. Boilers which are sold outright or purchased on the deferred payment system are inspected and cleaned at a charge of 5s. per visit; repairs, &c., extra. Usually one visit per year is sufficient. The number of boilers attended to per annum is 3400. A special grade of labour (water heater maintenance men) is employed for this work; and mates are available, if necessary, for boiler disconnections, &c. The number of boilers and geysers attended to per man per day averages five—say, three geysers and two boilers. Geyser and boiler maintenance is worked together by the same grade of labour.

Radiators.—Steamless radiators are dealt with under the general fire inspection system. Steam radiators are attended to twice per winter—Oct. 1 to March 31. Labour is given gratis both for radiators on hire and for those privately owned. Materials are charged for only in the case of the latter. The number of steam radiators attended to per annum is 2400. Fire maintenance men are employed on this work; and the number of radiators attended to per man per day averages 10. This time includes black-leading, adjustment of burners, watering, and standing-by to see valve come into operation.

Coke Boilers.—Special terms are quoted in every case, based on the cost of the work. I do think it is essential that we should try to develop coke boilers on the district. We are all endeavouring to sell coke for this purpose; and we cannot do this without maintaining coke boilers. Complaints of "bad coke" very often arise from the fact that the boiler needs cleaning.

Gas Engines.—Special terms are quoted, as warranted by each case, for periodic overhauls. Now that competition is so very keen in the power section of our business it behoves us to safeguard our engine load as much as possible; and with this end in view, some few years ago a special examination was made, without charge, of all the engines in use on our district. Small repairs and minor adjustments were undertaken free, and in a number of cases estimates were submitted and accepted for substantial overhauls. By this means many power-users were saved; and as the service was appreciated, we have continued it, most of the engines now being seen by our special representative twice each year.

INSPECTION OF APPLIANCES.

Turning now to the inspection of the appliances in the houses of consumers in Croydon, we have not, up to the present, embarked upon any general system in this connection, but sufficient has been done experimentally to assure me that this work is well worth while. Following the policy of the Gas Light and Coke Company, we have sent a service letter, in which we say that a representative will be calling shortly to ascertain if the gas equipment is satisfactory; the hope being expressed that access will be afforded, which is the case (and gladly so) in 99 instances out of 100.

Here is a résumé of the inspections carried out in four roads (two typically "ordinary" house property and two well representative of the average "prepayment" house) to determine the justification for, and advisability of, a systematic house-to-house inspection—a service which I hope to place upon a con-

tinuous footing as soon as the necessary staff can be trained and rendered available:

Number of houses visited	279
Number of faults found and rectified of which we had no previous knowledge	162

For example: 37 houses had unsound compo pipe.
23 houses contained defective lighting fittings owned by Company.
21 houses contained defective lighting fittings owned by customers.

Business secured:
15 additional cooking stoves.
7 additional fires.
4 orders to run additional points and fix extra lighting fittings.

The average time occupied per examination made was 1 hour 38 minutes, and the cost of the fitter's time per examination was 2s. 3½d., there being further expenses (here uncosted) for rectifying the faults found beyond the ordinary adjustments. The examining fitter made a gauge test of the house-piping and attended to all taps, burners, and stoves.

On the whole the results secured show clearly that such a service is greatly appreciated by consumers, and, also, that it is necessary in the interests of our business, as there are very large numbers of people who suffer in silence rather than complain. ["Hear, hear."] Moreover, I feel that, in districts that have not been recently and thoroughly canvassed, this work can be made remunerative as a purely business-getting scheme, apart from its invaluable service function. In the future, I think that, instead of canvassing for new business on the old lines of letters and calls, we shall derive far more success by indirect canvassing in the form of these inspections. The new business or salesmanship aspect of this question is one that presents a little difficulty. Clearly the right type of man must be allocated to the work; and there is wanted, in my view, a man of practical experience with a wide knowledge of gas apparatus—its performances and proper fields of employment—and with the salesman's polished personality which "gets him there." It is no use having the practical knowledge without the personality which enables a man to put that knowledge to profitable account. This is just the difficulty we are confronted with at Croydon. The very rapid growth of the district prevents our putting into training the men required for the work of ordinary house inspections.

THE DISCUSSION.

General Principle.

Mr. H. C. SMITH (Tottenham): When this discussion was first suggested, it seemed to me that it should be at a joint conference of the Institution of Gas Engineers and the "B.C.G.A.," because I feel, partly from my own experience and partly from the experience of other people, that it is no use trying to introduce a comprehensive maintenance scheme until you have first of all tackled the distribution system. It must be obvious to everyone that it is absolutely essential that the mains themselves should first be tackled. We should see that we can supply the consumer with an adequate quantity of gas, at a proper pressure, at any time of the day or night. Otherwise, whatever we do in the form of maintenance is going to be lost. In fact, it may do harm. What I have said does not apply to maintenance from the point of view of safety, which is very important. In the case of my own Company, we have, ever since the Board of Trade recommended it, inspected fittings from the point of view of safety; and we have found that, of the fittings we have inspected, it has been necessary to scrap about 25 p.ct.

Mr. W. B. MCLUSKY (Halifax): Why not stop making gas until we get the mains right? [Laughter.]

Need for Action.

Mr. HARRY CLARK (Derby): It is with enthusiasm, and yet with considerable regret, that I rise to support the resolution. Enthusiasm, because I am glad of the statesmanlike endeavour to deal with this very important problem; and regret, because of the existence of such an elementary weakness in our services to the public. I quite agree with previous speakers that the time is ripe for action, and a very definite move in the matter, because experience has taught us during the last few years—particularly the last year—that the future of the gas industry will be jeopardized unless a system of inspection and maintenance of consumers' appliances, pipes, and fittings is carried out by the various gas undertakings. I am not so much concerned with the present position of the gas industry as with the position in (say) five, ten, or twenty years' time; for it is quite obvious that before long the average price of electricity will be about 1d. per unit for heating. Practical experience has taught me that he is a clever man who can obtain new business, but he is an equally clever man who can retain the old business, in the face of keen competition. I am not an alarmist; but I do insist upon facing the facts, and say very clearly that we can only hope to maintain, or increase, our business by carrying out the resolution in its entirety. In pursuing this question, I would like to refer to Mr. Goodenough's remarkable leader, entitled "Progress," in the last issue of the "Bulletin"—the finest we have had the pleasure of reading—the keynote of which is "Progressive in deeds," which I hope will be the result of this conference.

Samples of Defective Pipes and Fittings.

With a view to a practical demonstration of the present state of affairs in the industry, and to show the absolute need for definite action, I have here for your consideration examples from two large towns of defective supply pipes and fittings, each of which was taken from a consumer's house.

The Specimen Amateur Connections have been photographed on a Larger Scale than the rag-bound Pendant, in order to show up their defects.

First.—This defect was found under the floorboards of a bedroom which was in constant use. It was a piece of compo pipe with two leaky joints, one wrapped up with a piece of rag. The other specimen shows that an attempt had been made to repair the leak by re-heating the solder, with the result that the pipe was distorted and the joint left unsafe. Inquiries showed that the tenant would not pay, and the landlord also refused to pay, to have the work done properly. Eventually electricity was installed both for lighting and cooking, and the gas meter was removed.

Second.—This defect is also interesting, because it clearly demonstrates the need for action. It consists of a piece of house main supply pipe; the joint between the two lengths of lead pipe being made by means of a piece of rubber tubing. The joints at each end were made with putty and soap. In this case, the consumer had been in the habit of keeping the window wide open because there was an escape of gas. Neither the tenant nor the landlord would pay for repairs.

Third.—I make no apology for showing this defective pendant from the living room of a working-class house, because it is essential that we should fully realize the present weaknesses in our gas supply methods. This pendant, with a split tube, is covered with soap and cloth to prevent the gas escaping; and it had been in use for over twelve months in this deplorable condition. Again, neither the tenant nor the landlord would pay the cost of a replacement.

These are only three examples, representative of many others; and they show that, while the gas undertakings cannot be blamed altogether, because they are not notified of the trouble, some action is required.

Terms of the Resolution.

At this stage may I point out what I consider an important omission in the terms of the resolution? I would suggest that the three words "pipes and fittings" be added to the resolution, following on the words "gas appliances," and so cover all possible weaknesses in gas supply. Now, what will

be the position in the near future, if some such movement as we are advocating is not carried out? We shall still have the tenant, as well as the landlord, refusing to pay, and the gas undertaking still adopting the attitude of "sitting on the fence," with the result that our competitors will step in and capture the business. I recognize the vast amount of excellent pioneer work that has been done in recent years by the organizations which control our industry; but let us go from this conference determined to carry out this resolution, and so materially strengthen the position of the industry. We have a good article, which we sell at a reasonable price, and which has been proved absolutely necessary in the life of the community. Then why pause when it comes to safeguarding the future with a proper system of inspection and maintenance of gas appliances, pipes, and fittings? In dealing with the latter part of the resolution, we have to face the fact that the gas industry is in competition with other engineering industries for the best brains in the rising generation, so too much attention cannot be given to the scientific education of all grades of our workers. I stand for a bold and comprehensive policy, and sincerely hope that this conference will give a lead for a national movement such as is worthy of the two organizations that have called it. I strongly support the resolution now before the conference.

Send the Resolution to the Districts.

Alderman Waddington (Halifax): I am not a paid official, I am not an engineer, neither am I a commercial man engaged in the business of trying to sell gas or appliances or fittings. My position is that I am the Chairman of the Committee having charge of our municipal gas undertaking; and it is from that point of view that I want to say a few words. No one would disagree with what has been said; but there is to-day an opportunity of offering suggestions and criticisms with regard to the question before us. What I would urge is that we are up against a very complex problem. It is a serious thing to give any authority power to go round and inspect anything that is in a consumer's dwelling or business place, and make a report on it. This means cost to the consumer. What we have to consider, in the first place, is uniformity over a district. For instance, it is no use for (say) the city of Leeds to take up this ideal of uplifting the gas industry, if lethargy is to remain in the surrounding areas. We ought to send this resolution down to the different districts, and ask them to consider it with a view to uniformity of action in particular areas. We ought to uplift the industry, if it can be uplifted, and pass on the cost of the uplifting to the consumer. The carrying out of the policy suggested presents serious difficulty. In the towns of the West Riding most of the gas fittings and appliances are dealt with by the general plumber, who does not favour the municipality (who generally own the gas undertakings there) taking on the work. Now, in a case of this kind, one of the first principles is to obtain the goodwill of the man who is going to do the work; and if this is to be a private trader, we must get him on our side, and see that he is a co-partner in the job that is being done. We want the plumber to work in co-operation with the gas industry, so that the work may be properly and soundly carried out.

Appliances for Nothing.

It does seem to me that, arising out of this discussion, we might go a step further, and consider seriously whether it would not pay the industry to give appliances and fittings for nothing. Then we should no longer suffer from the competition of shoddy articles which result in complaints. If you are going to send round a big staff of men to look after the appliances, the charge is ultimately coming on to the gas; consequently, you can go one step further, and give the appliance for nothing. If it would make people use more gas, it might be well worth while.

Mr. C. S. Shapley (Leeds): The last speaker having referred to Leeds, I feel constrained to say a few words. We adopted a method which other gas undertakings have employed—that of leaving at houses visited a postcard having on it a number of lines, so that a cross could be put against the appropriate line when anything was wrong, the card could be dropped into the post, and then the Department could send to put the matter right. This, however, is not at all satisfactory, and I am going to recommend an entirely new scheme. As to what should be done in the event of an escape, I say: "Put the matter right, and if you can get the money, do so; but if you cannot get it, then wipe it off as a bad debt."

Free Apparatus, &c., in Dundee.

Mr. J. Phin (Convener of the Dundee Gas Committee): It is up to us to devise ways and means whereby we can sell more gas; and the only way to do this is by giving the customer a fair deal from start to finish. This means giving everything free, as we do in Dundee. It may be said that the cost is heavy; but I am always prepared to take the long view, and see that I get my return at the end. I take it in most places the gas supply is more or less of a monopoly; and if a monopoly is misused, the consumer suffers, and instead of friends one has enemies. The more you do for the customer, the more the customer will do for you by buying your product. In Scotland, we have a law which says that cases of houses not sufficiently supplied with water must be put right. Why not the same with gas? The one is equally essential to public health as the other. We have laws which lay down a certain standard for sanitary conveniences in houses. Why not for gas? I do feel that, unless you take this matter into your own hands, legislation will be passed sooner or later to compel you; and I think it will be justified. The wants of the consumer should come before considerations of private enterprise every time; and I think our Corporation back that up. Last year our Manager put forward a further step in maintenance; and at that time I was the principal opponent of it, because I felt we were going too far. He proposed that we should have a general maintenance scheme which started at the meter and went to the consumer's fittings. At present we have 61,000 gas fires and cookers out free, in a population of about 170,000. What we are doing to-day is not adding to the cost of the gas, which is as cheap to-day as it was before the consumption began to mount up. We are getting our money back all the time. Under the new scheme, we are proposing to re-pipe all private houses from the gas main to the meter, if required, free of charge, supplying materials and labour, provided that the landlord or tenant re-pipes the lighting fittings to our satisfaction. The putting-in of a cooker or fire may affect the pressure of the gas to the burners. If that is the case, we say the pipes are inadequate; and our maintenance scheme is designed to put that right. We take the pipe to the meter, and up to the cooker or fire. We are only putting on the landlord or tenant the onus of providing piping to our satisfaction from the meter to the burners.

Inspecting Pipes and Fittings at Burnley.

Mr. J. P. Leather: Many years ago the Burnley Corporation Gas Committee seemed to think it did not matter what sort of pipes were put in. My father, however, was able to persuade them in a little while that they were losing business through not looking after the pipes. Since then they have always inspected pipes and fittings. Gas is never turned on to any premises if the fittings are not perfectly sound. They also refuse to pass pipe which is not sufficiently strong—that is to say, pipe which is likely to develop into weak pipe.

Free Cookers do Not Pay.

Mr. W. M. Carr (Stretford): A great danger we must guard against in giving "something for nothing" is that a consumer is likely to ask for apparatus that he does not really require. The undertaking for which I am responsible fixes cookers without charge. I am satisfied, from experience extending over four years, that it is a mistake ["Hear, hear"], and that we should get just as many cookers out and just as much business without this inducement. In fact, we should do better business, for we should not have capital lying idle. We have many consumers now who are only making use of one boiling ring on the top of the cooker, and never utilizing the oven at all for cooking purposes. That is a real danger. Many small houses with a consumption of perhaps 12,000 c.ft. per annum have a free cooker; and it does not pay. The cooker costs (say) £6; and the return on the gas does not pay sinking fund charges on the cost of the cooker and installation. I personally believe it would be a good thing if the gas industry had legislation which obliged it to look after the consumers' fittings, provided there was also legislation which permitted the making of a charge which was commensurate with the service which the industry rendered to the public.

Responsibility for Inspection.—No Compulsion.

Mr. C. F. Botley (Hastings): After the last observation made by Mr. Carr, I think it necessary to say a word about this question of inspection, and the responsibility attaching to it. Accepting responsibility for what we do voluntarily is quite a different matter from having inspection thrust upon us by legislation, and then being held responsible. ["Hear, hear."] I feel that I am justified in saying that, while most of us here would welcome the development of maintenance on the voluntary lines open to every one of us to adopt, and which many of us have adopted, we should resist very strongly any compulsion of inspection of consumers' fittings and appliances. I do wish to voice that point of view. Mr. Carr would welcome compulsory legislation; but I stand for the other school of thought, and say I would resist to the utmost anything of the sort. ["Hear, hear."] While I am doing everything in my power for the development of the maintenance system to the utmost, because it is business, I feel that to have it put upon us by force would be absolutely wrong, and not in the interests of the gas industry.

Maintenance Necessary.

Mr. William Phillips (Luton): In the case of Luton, it is only four years since we started a proper showroom. Before the war, we considered the gas was cheap enough to self itself; but I am of a very different opinion now, and heartily support the resolution. We have instituted, as from the beginning of this year, a maintenance scheme on the lines of the resolution; and we are getting our fitters into their work properly.

Mr. W. L. WESTBROOK (North Middlesex Gas Company): I am of opinion that a maintenance scheme is absolutely necessary; but I also consider legislation is necessary to prevent such examples as have been produced this morning from being put in at all. Why not have registration of gas fitters?

The CHAIRMAN: I think we have had ample discussion on the general principle.

PIPE INSPECTION.

Mr. GOODENOUGH: With regard to the suggestion to include the words "pipes and fittings" in the resolution, I may say that I purposely left out "pipes," because I thought that would raise in many people's minds the question of the inspection of pipes hidden under floors and buried in walls. Of course, every proper scheme of inspection embraces all steps possible to inspect and test the soundness of carcassing; but you cannot properly inspect pipes that are hidden. I think the wording covers the ground sufficiently to put before the industry a general policy. I am strongly opposed to the idea of legislation to compel the gas industry to carry out this policy. To start with, you would lose all the goodwill that you have secured by doing the work voluntarily yourselves ["Hear, hear"]; and that goodwill is worth a king's ransom. We have letters from consumers in all parts of our district expressing gratification at the system, and saying they wish other businesses were conducted on the same lines. Had we been compelled to do what we have done, we should have lost all this goodwill. Our whole object is to avoid legislation.

The CHAIRMAN: I am glad to think that the speakers generally have been in favour of the system of maintenance being put into operation. I will now put the resolution to the meeting. It is carried unanimously.

Afternoon Session.

COSTS AND HOW THEY SHOULD BE CHARGED.

The CHAIRMAN: Everyone realizes that whatever we do must cost something, and must be paid for in some shape or form. Therefore we get back to the question of whether it should be put on the price of gas, whether it should be dealt with in the rentals, and so forth, or whether in the case of ordinary consumers they should be asked to pay for the actual work done.

GAS LIGHT AND COKE COMPANY'S SYSTEM.

Mr. STEPHEN LACEY: Our Chairman very wisely decided to get the resolution out of the way before discussing what he termed, for the want of a better name, questions of detail; but I am sure you will agree with me that these questions of detail involve matters of great importance. We might say that they are matters that could only be profitably discussed after the general principle had been accepted. I find it rather difficult to confine my remarks to cost alone, because it does appear to me that this problem must be considered as part of a very much larger problem. I think it is of very great importance that our policy should be a consistent and inclusive policy. As Mr. Goodenough has said so many times, the policy of gas undertakings should be directed to the service of the consumer. Perhaps, from the more technical point of view, I should put it that the policy should be directed to gas playing in the future to the full the part which it is on its merits entitled to play. What has been said this morning makes one realize the grave disadvantages suffered by some of the municipal undertakings. Those undertakings which are doing their own installation work—running their own pipes and supplying and installing their own fittings and appliances—are clearly in a much stronger position, when we come to consider the question of inspection and maintenance, than those that have to see sometimes very indifferently qualified people doing the work that they should be doing themselves.

Coming to the question of cost, I entirely agree with Mr. Carr that it is inadvisable to give "something for nothing." In the case of the Gas Light and Coke Company, they do practically the whole of the installation work themselves. I do not think I should be over-stating the fact if I said that 90 p.ct. of the installation work in their area is done by the Company; and we succeed in obtaining the full cost of that work. The figure of £750,000 in the course of a year represents the full cost, including the overhead charges; and I think all will agree that if these costs can be charged to, and recovered from, the consumer without increasing the price of gas, it is obviously desirable to do so. Particularly is this the case if it can be done—as I believe it can be—without losing anything in the eyes of the consumer. In fact, we find that the consumer who pays for a service values it more than does the consumer who gets the same service for nothing.

HIRE *v.* SALE OF APPLIANCES.

There is one particular question that I want to stress, and that is hire *versus* sale of gas appliances. I take it that in the early days of hiring the reason for letting stoves on hire was that consumers were more ready to have gas appliances installed if they were on hire, because then, if the appliance did not come up to expectations, it could be returned without loss of capital to the consumer. That was in the days when gas was not so strongly established as it is to-day. At the present time, there is no doubt—certainly so far as cookers are concerned, and perhaps also fires—there are many consumers who are prepared, and are in fact anxious, to buy; and I believe it is true that there are many gas undertakings which are reverting to the old policy of selling where they can—probably with the idea mainly of saving the capital outlay. But my own view is that, when considered in relation to maintenance, letting apparatus on hire is infinitely preferable to selling outright; and I will give briefly my reasons.

In the first place, the rental of hired apparatus can be so arranged as to cover, not only interest and depreciation on the appliance itself, but also the cost of maintenance. Another great point about letting appliances on hire is that the fact of these things being the property of the Company entitles the Company to enter the premises where they are fixed without making any special request. Also stoves on hire can be scrapped at the discretion of the gas undertaking, if it is found that they have become obsolete. Gas apparatus suffers, perhaps, from its very robustness. The physical life of a gas appliance is almost endless; and when a consumer is looking at a stove belonging to him which appears perfectly sound, though possibly it may be thoroughly out of date, he regards it as a capital asset, and is very reluctant to see it scrapped. The Gas Light and Coke Company have experienced great difficulty in persuading people to allow their own stoves to be exchanged, or stoves on hire to be substituted for privately owned apparatus, when the stoves in question are obsolete. A further great point about having a large proportion of the appliances on a district company-owned is that the gas undertaking can then establish its own standard of efficiency—a very important thing. I can quite see that, with a municipally-owned undertaking, where the apparatus is largely the property of the consumers, there is great difficulty in making a start on this question of maintenance; but, as I have said, if you have a solid block of apparatus owned by the undertaking, you can set up your own standard of efficiency, which is very desirable.

I should like to say just one word upon the way in which the rentals of hired apparatus are arranged. I think all of you must be conversant with the very great differences in rentals charged by different undertakings for the same apparatus, as well as in the sale price of the same apparatus in different areas. It seems to be highly desirable that the gas industry should act together in that regard, and decide anyhow what are the economic rentals for certain types of appliance. Take, for instance, a modern gas fire. The way the Gas Light and Coke Company arrive at the rentals is this: We first make an estimate of the life of the fire—not its physical life, but as to when it is likely to become obsolete. We may put it (say) at twelve years. Then our rental is made up of two portions. One represents the amount required to pay interest on capital, and to provide a sinking fund to write off that capital within the determined period. To this is added a lump sum to cover repairs and maintenance, which in our case, with fires of the ordinary size, is 4s. a year. In this way we arrive at the rental. Perhaps I might take a concrete case. If a fire were to cost the Company 50s., and assuming the life is going to be twelve years, it would require 5s. 6d. a year to pay interest and capital charge; and to this we should add the lump sum of 4s. already referred to, making the rental 9s. 6d. per annum. As to selling, in one district you can buy a fire at a certain figure, and somewhere else you will have to pay 10s. more for the same article. If you are going to encourage hiring with the idea of getting as much apparatus as you can under the control of the Company, the relation between selling price and rental is of considerable importance. If you want to encourage hiring, you must make the selling price relatively high as compared with the rental. Our experience is that these rentals are sufficiently attractive to the consumer for him to hire in preference to buying outright. I have somewhat elaborated this question of hire and sale, because I believe it to be of great importance in relation to maintenance.

MAINTENANCE AT DUNDEE.

Mr. J. DICKSON (Dundee): The output of gas in Dundee in 1905 was 600 million c.ft.; in 1909, with free cookers, it was 900 millions; and with free gas fires coming along, the increase since that time has been from 900 to 1800 millions. This free apparatus means that automatically a maintenance scheme came into operation, because the number of free cookers and fires now out totals roughly 61,000, and all these years we have had to have some sort of maintenance of this apparatus. To-day, for instance, our costs of maintenance of cookers reach £10,000, and of fires £5500; and this means 3d. per 1000 c.ft. on the gas sold. But, in spite of this, the capital employed per million c.ft. stands at the very low figure of £284. So you can see that the progressive policy inaugurated in 1905 and 1909 has had rather a remarkable effect in this direction. Now as to the maintenance scheme. We conferred with the Glasgow Corporation, and were so impressed with the effects of maintenance there that the Council adopted a further scheme for the maintenance of consumers' appliances.

Applications were asked from the gas fitters in our employ who desired to take up this branch. Meetings of gas fitters had been held weekly at the works for many years, for experi-

mental work, and for showing new appliances, &c., so that the men selected had a thorough knowledge of all apparatus. On March 1, 1926, 24 men started to survey approximately 54,000 consumers' meters. The town was divided into seven districts —five districts having four men, and two having two each—and this work was completed by June 30. Thus each man did eighteen a day. The inspectors were given out thirty buff-coloured cards each day, and entered on them the names and addresses of consumers, size, maker, and class of meter, size of street service, inlets and outlets at meter, pressure with appliances and lights extinguished, and also when burning, number of lighting burners and all appliances, whether on loan from the Department or their own property, and also any complaints. These were handed in next morning; all complaints being written on cards, and handed over for immediate attention by existing maintenance men. The information obtained was then written on white history cards. These are kept in the office, and a record registering all orders and complaints is written on the back of the cards.

The maintenance men started on their first visit after the survey on Oct. 15, 1926, as they were required during the summer months to clear-up arrears of work with which the existing staff could not cope. The number of men employed was reduced from 24 to 16 (giving them approximately 4000 calls to make). They attend to, and overhaul, all lighting, cooking, and heating appliances in their district—such as overhauling and adjusting lighting burners, overhauling and renewing parts of cookers, and overhauling and re-fuelling gas fires—with the exception of steam heated radiators and geysers, which are specially attended to. They make on an average 28 calls per day; and although the consumers were at first chary regarding their visits, they are now making all the necessary arrangements for their coming, or leave word with a neighbour if anything is requiring attention, or if their lights and appliances are in good order. In fact, many who had at first refused admission to the men are now on the outlook for them. The men also have a price list with them, so that they can give an idea of the price if a consumer wishes to instal any new fitting or appliance which can be seen in the showroom. The visits paid without request have been the means of discovering many escapes both on inlet and outlet of meter, which had been going on for a considerable time without giving inconvenience to the consumer, but assuredly would have caused later serious complaint, and led to detriment to the health of the user. The cost is not going to work out at more than an extra ½d. per 1000 c.ft. of gas sold.

In an industrial community such as Dundee, where both parents work, it is highly important that the appliances are kept in first-class order, in conjunction with an adequate supply of gas to enable them to have the dinner cooked in as short a time as possible. With regular visits from the men, the cookers, &c., will be kept much cleaner; and this will tend to lengthen the life of the various appliances. One result of the maintenance men attending to complaints on their rounds is that the "deficient" and "no light" complaints for January, 1927, were reduced by 20 p.ct. Generally speaking, the scheme has given unbounded satisfaction to the consumers.

Arising out of the gas fitters' meetings previously mentioned, the sheet metal workers, with the permission of the Dundee Education Authority, have started evening classes, a special feature of which is the teaching of the proper angles and sizes of flue pipes relative to ventilation, &c. The Gas Department have done everything possible to secure the best type of men for the work.

The CHAIRMAN: The whole cost is put on the price of gas, and the consumers are satisfied with this. Nothing is charged specifically to the consumer?

Mr. DICKSON: No; we do not charge in any way beyond the gas.

The CHAIRMAN: Mr. Lacey, of course, pointed out that his whole cost was put on to the consumer in the shape of rentals; and he advocated the principle of hired apparatus, because one could more easily put the cost on the consumer in this way. Does it give satisfaction to the consumer to put it on the price of gas, or does it not?

HAVE THE CONSUMER'S CAPITAL INVESTED RATHER THAN YOUR OWN.

Mr. P. S. HOYTE (Plymouth): I do not know whether it is quite in order for me to raise the question of simple hire as compared with direct sale or sale by hire purchase. It is a point that really affects this subject of maintenance. I understand that Mr. Lacey's Company do not hire out every apparatus they supply. I take it that it is only certain standard types, and that other types they sell outright or by hire purchase. What scheme have they for maintaining the apparatus that is sold direct? I think it was in 1919 that in Plymouth we gave up simple hire, and went over to direct sale and sale by three years' hire purchase. If we had not done so, we should have been driven to Parliament for permission to raise further capital years sooner than otherwise. I do think it is an important point in these days of electrical competition that you should have your consumers' capital invested in apparatus rather than the company's capital. ["Hear, hear."] It gives the consumer a more direct interest if the apparatus is his own. We have all read the last issue of the "GAS SALESMAN," and noted Mr. Lacey's views on the subject. Of course, the fact that the company own the gas fire gives one an entry to the consumer's house; but I do not see we are very much better off that way than we should be with legislation for compulsory inspection of fittings. If you depend upon the goodwill of the consumer, you are just as well, if not better, off. I should like to know what the Gas Light and Coke Company do with regard to the maintenance of apparatus which is the consumer's own property. There is not very much "cloth left to cut" in the case of the modern fire, and the same remark applies to the cooker. It is therefore very difficult to know when this apparatus is, as foreshadowed by Mr. Lacey, going to be obsolete. A large proportion of the fires we have out in Plymouth have been sold within the last few years, and are of a thoroughly modern type. Our consumers, I think, are likely to be satisfied with them for many years to come. We charge 1s. a visit for one fire, and 6d. for each additional fire. The annual overhaul is at the commencement of the lighting season. We charge the cost of new fuel. So far this scheme has worked extremely satisfactorily, and we do not propose to alter our policy. Other conditions may suit other towns; and it is quite likely that each point of view is correct.

CHARGING THE COST IN THE GAS RATE.

Bailie PATERSON (Glasgow): It saves any question as to who is going to pay, if you charge the cost of maintenance in the gas rate; and I think it works out equitably, because the small consumer has always the smallest number of appliances, so he is being charged in the same proportion as the larger consumer with the greater number of appliances. Maintenance does away to a great extent with the Complaints Department. Very often we hear it said that "the gas is bad," when really it is the appliances which are at fault. In this way, it saves money to the department. It also saves temper, and it is the very best means of advertising.

CASE OF THE SLIDING-SCALE COMPANY.

Mr. J. J. PATERSON (Dover): With regard to the system of charging for maintenance service, I think there is another aspect. It is well known that undertakings owned by municipalities do not work for a profit.

Mr. A. W. SMITH (Birmingham): I beg your pardon.

Mr. PATERSON: In other words, they have no dividend to pay. Company concerns have to make a profit. In this category, again, there are maximum dividend and sliding-scale companies; and with the sliding-scale company, the dividend is dependent upon the price charged for gas. It is perfectly obvious that those in control of such an undertaking would not be inclined to saddle the price of gas with all these extraneous charges for the maintenance of all and sundry appliances. I personally have the honour to be in charge of a company undertaking—not a sliding-scale company, but a maximum dividend company, so that we should have no compunction, if we embarked on a general maintenance scheme, in putting the whole cost on the charge for gas. I think it would be more popular with the consumers than a direct charge. At the same time, I can quite see—having been connected with companies working under a sliding-scale—the difficulty in getting those responsible to put off the time when they might be able to reduce the price of gas, and so "cut their own throats" by making a sacrifice of dividend.

RISK TO BE CONSIDERED—AND INSURANCE INAUGURATED.

Then there is the question of risk. Mr. Goodenough rather pooh-poohed the idea of risks to undertakings in the taking on of inspection and maintenance of privately-owned fittings of all descriptions. I cannot agree that the risk is so small as Mr. Goodenough tried to indicate. On the contrary, I think the risk is a very real one; and unless some form of insurance can be inaugurated and carried through on co-operative lines; the expense to be borne by the industry generally—I am afraid there will be very few of the smaller undertakings who will be inclined to saddle themselves with this expense individually. I throw out the suggestion about co-operative insurance against the risks, because I think it should have very careful consideration. There have been in the past substantial mishaps; and privately-owned undertakings have been saddled with great expense in consequence of accidents held to be due to negligence on the part of their officers or workmen. Really, it is a far more serious risk than we have been led to believe; and if we can cover this risk in the form of co-operative insurance, it will go a long way towards inducing the majority of those present to embark on this maintenance scheme.

DO NOT LOAD THE PRICE OF GAS.

Mr. A. W. SMITH (Birmingham): In my view, there is a line of compromise in this matter. There are some "whole-hoggers," who would charge the entire cost in the price of gas. I am not with them. I am more inclined to Mr. Lacey's point of view. We have to take into consideration the ability to bear the charge. Thus it comes back to a question of policy, and even district settlements will not meet the case. Every undertaking has to deal with this matter on the basis of its local conditions, and on the basis of its own financial conditions. So long as we all accept whole-heartedly the principle involved

in the resolution of this morning, we have to settle the method of procedure for ourselves. It is a matter purely of evolution. In Birmingham we are spending much money on replacing brazed-type pendants installed some 25 years ago. Therefore we are educating ourselves. Now we come to the question, "How much farther are we to go in maintenance?" I should like to go the whole way; but I do feel that, so far as it is possible, the charge should be borne by the consumer we are dealing with. At present we are engaged on the very complicated matter of determining the possibility of instituting a two or three part gas rate in this country, as in America. The Americans say that this system has meant a tremendous revival in the gas industry—particularly on the industrial side. Bearing this in mind, it seems to me that you do not want to load your price of gas with charges due to maintenance and supervision of horrible fittings perhaps put in by local ironmongers. If you are to maintain them, who should pay the charge? I do suggest that each one of us has to look at the matter from his own local point of view, with a knowledge of his own particular consumers—and of the apparatus on the district, if you like. In Birmingham now, we have a co-operative arrangement with the private master gasfitters, who have become our contractors. They do much of the work at a schedule of rates which we agree together; but there is a certain type of work which we keep in our own hands. Once again, I strongly urge that, in this question of cost, you cannot lay down any hard-and-fast lines at this meeting. It must be left to each undertaking to settle its own troubles.

Maintenance to Preserve Our Business, and therefore Our Dividends.

Mr. W. W. TOWNSEND (Colchester): As representing a sliding-scale company, perhaps I may be allowed to state that in my view, and in that of my Directors, we should be jeopardizing our sliding-scale dividend if we did not adopt maintenance. One of the objects is to preserve our business, and therefore to preserve our dividends. We have been having house-to-house maintenance for some eighteen months to two years, and we have found it of the greatest service. The increase in the output of gas and sales of appliances was greater last year than in any year of the past decade. In connection with the question of cost, we seem to be discussing two or three different things. I rather understand from the resolution passed this morning that what we have determined to do is to adopt some scheme for the maintenance of appliances—*all* appliances; and that is at the root of the whole problem. Many people have gone in for lighting maintenance for, I suppose, the past thirty years. But if you charged them for it, a certain number of them would have it, while those who needed it most would not have it. You cannot do what we are setting out to achieve unless you impose some proportion of the cost upon the gas consumers as a whole. You must include private appliances wherever they are and to whomever they belong. How do the Gas Light and Coke Company deal with the cost of this work?

Privately-Owned Apparatus.

Mr. LACEY: We attempt to deal with the maintenance of privately-owned apparatus in the same way as hired appliances. We try to get paid for it. Mr. Hoyte makes a charge of 1s. per fire. In respect of what proportion of the privately-owned stoves does he get paid that 1s.? It has been urged that if you are going to insist upon dealing with all the appliances, you will have to do the work free of charge. We have been round the whole of our area attempting to get all our lighting business maintained on a basis which we took from Croydon. We make a charge of 2d. per burner, and the consumer pays for the material. We find from the complete census that we have got 25 p.ct. to agree to that; the remaining 75 p.ct. are in the same position as before. There is a great deal to be said for the argument that has been put forward that, if you want to deal with all the appliances, you will have to do the work for nothing. But it is a pity to come to that if we can avoid it; and the system of hire does permit us to charge where it is possible to do so.

Mr. GOODENOUGH: It is going to be a good many years before gas undertakings have been able to train sufficient men of the right quality to maintain every appliance in their districts. In the meantime they will be able, if their salesmanship is right, to get paid by consumers, either by rental or maintenance charges, for as much of the work as they are able to undertake. I would strongly advise not loading the charge for gas with maintenance costs, if it is possible to avoid doing so. Every undertaking has to decide its own policy, according to local circumstances. As a matter of principle, I would much rather get the service paid for than charge it in the price of gas.

Calling Attention to a Danger.

Alderman WADDINGTON: I consider we could discuss this question better in a smaller conference than we have to-day. We have passed a resolution this morning; but it simply means nothing unless we start to do something somewhere. There is great danger in this question. You have in every town in the country appliances which are not what you might term "hall-marked." A lot of them have not been made by British manufacturers.

The CHAIRMAN: If you wish to move a resolution that the matter should be discussed at all the District Conferences, I am sure it will be considered. We have already asked the District Salesmen's Circles to consider the matter; but if you would like District Conferences of the British Commercial Gas Association to take it in hand also, you can move to this effect.

Alderman WADDINGTON: I do that.

Mr. SHAPLEY: If you refer it to the districts, what will the districts discuss?

Alderman WADDINGTON: I am going to urge that there is very great danger in sending round and examining appliances which have not been supplied by the undertaking itself. If you send a man from the gas-works to examine a certain appliance, and he says "That is all right now," people will go on using it. Thus there is a danger in certifying appliances which are not of our origin.

What will Neglect of Maintenance Cost?

Mr. A. H. EVANS (Chairman of the Wallasey Gas Committee): I have been sent down to attend this conference because my Committee have been considering the question of maintenance. Now, in approaching this matter, it seems to me the most important point—whether we represent a municipal undertaking or a company—is, "What will it cost us as an undertaking if we do not take in hand this work?" In Wallasey we have a very strong municipally-owned electrical undertaking, with a price for lighting of 5d. per unit, and 1d. for power; and they are talking about reducing it again shortly. If, therefore, the gas undertaking does not do something definite with regard to maintenance, we are going to be in "Queer Street." It seems to me that it will be cheaper to pay £2000 a year—or whatever may be the cost of sending round capable men, who will not only look after the appliances, but will give advice to the consumers—than to go on in the way we are doing at present. We should have men capable of becoming the "guides, philosophers, and friends" of our customers. I am not troubled about the plumbers at all. I find the plumbers are washed out in our district.

Policy at Portsmouth.

Mr. T. H. F. LAPTHORN (Chairman of the Portsmouth Gas Company): For your information, I would tell you briefly the policy we have advisedly and after great consideration adopted, and are acting upon, in Portsmouth. We have come to the conclusion that it is better to charge maintenance to the consumer, and make no attempt to get it back in an increase in the price of gas. We have also decided that it is better to avoid as much as possible a direct charge to the consumer by wrapping it up in the rental of the appliance; and it is our further policy not to push the sale of appliances, but in preference to let them out on hire, because our experience is that every person who owns his own appliance will stick to it long after it has become obsolete, and so bring discredit on the gas appliance.

Capital Involved an Influencing Factor.

The CHAIRMAN: I think the summing-up of this discussion would be that each one must judge for himself, by his own particular circumstances, what he should do in this matter. ["Hear, hear."] In some cases it may be possible to get the whole of the charge from the consumer in the shape of rental or direct payment for work done. In others, so far as you can get it in this way, you should do so; but you will not be able to get it all, and probably some part must come on the price of gas. There are others, again, in the North of England and Scotland, who feel it is very difficult to get any portion of the charge by this means, and who are driven therefore to put the whole cost on the price of gas. The matter must be mainly one for each individual undertaking to decide for itself. We have had a useful discussion, revealing why particular undertakings think one system is preferable to the other. To me the most interesting part is the advocacy by the Gas Light and Coke Company and Portsmouth of the policy of letting appliances out on hire, in preference to selling them outright. The policy of my Company is rather the reverse of that. We think that the capital involved is an influencing factor; and we should prefer to see more apparatus belonging to the consumers, and less to the Company.

WORK OF INSPECTION AND MAINTENANCE.

The CHAIRMAN: I should now like the conference to turn its attention to the question of whether it is necessary to inspect beforehand, and whether one should send specialized men for each particular job, or universal men to carry out the whole of the work. Clearly, there must be differences of opinion here again. It seems to me that if you are going to send an inspector, and then a gang to deal with fires, another for cookers, another for geysers, and yet another for lighting appliances, and at fairly frequent intervals, you are more or less going to harass your consumer. ["Hear, hear."] Naturally, large and small undertakings must have different ways of dealing with this matter. Much seems to me to depend upon how you are going to use your inspectors. If you decide to send them

only to inspect, you are going to embark upon a somewhat costly method of dealing with the situation.

GOOD TYPE OF MEN FOR INSPECTION WORK.

Mr. GOODENOUGH: The system adopted by the Gas Light and Coke Company is to send men of qualifications and type considerably above those of a fitter to inspect consumers' appliances and to take a census of them. We have found that by employing men of good type and education, with sound practical and theoretical knowledge, and at the same time with a commercial flair, to make the inspection, take the census, and interview the consumer, we are able to give the consumer far better service, and to secure for ourselves far more business, than if we sent men of less ability, who would be able to carry out the maintenance work necessary, but who would not be in the same position to discuss with the consumer the suitability and safety of appliances in use, and to put before him the case for the extended employment of gas. If you do not happen to have available such a man as I have described—we call them examiners—and can only send out a fitter, he must get on with the work of overhauling the appliances as well as inspecting them. But our experience goes to show that it pays to employ the commercial type of practical man to make the first visit to the consumer. That is where we get an enormous amount of business, and are able to establish very friendly relations with our consumers. The letters we are continually getting from consumers as the result of this policy clearly indicate that it is a method of procedure which is much appreciated, and establishes a goodwill which it is very difficult to over-estimate in value.

WHAT THE EXAMINERS ACCOMPLISH.

Mr. ANDERSON: What is the ratio of fitters to examiners? In other words, how many fitters could an examiner keep employed?

Mr. H. H. CREASEY (Gas Light and Coke Company): The question is a very difficult one to answer, because we do not specially allocate fitters solely to carry out the work brought in by examiners. There are many other sources from which work arises on a district. For instance, the district inspector will bring in orders, and others will arise out of direct communications received from the consumers. The work which the examiners bring in is dealt with as part of the whole, and is not separated therefrom. It must also be borne in mind that the amount of work brought in by examiners differs in accordance with the type of district on which they are working—some, of course, obtaining better results and a greater amount of work than others. As some guidance, however, I would mention that, on a recent investigation of the position, I ascertained that each examiner is bringing in on an average about £12 worth of work a week—that is to say, fitting work to the extent of a charge to the consumers of £12 for material and labour. This amount of work is therefore provided for fitters, in addition to that arising out of the defects, escapes, and so on, which the examiners discover and book for attention. Examiners also obtain contracts for the periodical maintenance of consumers' lighting burners and appliances, which is a further source of work for the fitters who will carry out this maintenance work in future.

THE OBSOLETE FIRE.

Here I would mention something which strengthens the point made by Mr. Lacey, who put forward the view that it is better for us to hire appliances to consumers, rather than that they should purchase them. An examiner, on calling at a house, may meet with what may be spoken of as an obsolete gas fire, which is the property of the consumer, and as such is to him an asset. Here the examiner has to go carefully, as he may be on dangerous ground, because the stove may have been purchased from my own Company, in what, in the light of Mr. Lacey's opinion, I might perhaps refer to as "our erroneous past." On the other hand, the stove might have been purchased from one of the large stores or from an ironmonger. In any event, if the stove were absolutely out of date, the examiner would advise the customer to have it exchanged for a modern one on hire; and if he failed to achieve the desired result, or found that it was inexpedient to press the matter at the moment, he would endeavour to get the consumer to agree to sign a contract for us periodically to maintain the stove in future. From then onwards this stove would be under our eye; and the fitter who maintained it, and the foreman who supervised his work, would always have in mind the desirability of persuading the customer at the earliest possible moment to exchange the fire for a hired modern one. From the instant a hired fire is fitted, it becomes our duty—and our pleasure—periodically to inspect it, and to keep it in a satisfactory condition for ever afterwards.

MAINTENANCE FROM THE SMALLER COMPANIES' POINT OF VIEW.

Mr. WESTBROOK: Perhaps I may say a word or two from the smaller companies' point of view. I have had some experience of a general maintenance scheme; and I agree that the less we worry consumers by repeated visits, the better it is. I also suggest that general maintenance men, being fitters, require a certain amount of supervision, and that there might be a man in charge of four, five, or six men, according to the district. He would arrange with the consumers for the coming of the fitters, set out their work for them, supervise them during the time they were carrying out the examination and overhaul of the premises, and at the same time take a census. Speaking for the North Middlesex Gas Company, we have not so many trained men as we should like. I do not believe in training a person for three months, and then sending him out on the district. Such men—or boys—are going to do more harm than good. Men who have been specially trained for this inspection work bring in more business than ordinary fitters. Our results for the quarter ended September, 1926, were as follows: Total consumers visited, 1029; cookers overhauled, 955; fires, 230; geysers, 71; radiators, 3; circulators, 1; burners, 2446; boiling burners, 95; miscellaneous apparatus, 22; escapes repaired, 31. The total cost, less cash paid, was 2s. per consumer. This is rather lower than for some of the previous quarters, probably due to the fact that we have employed a rather better type of man, and also because the supervision has been a little keener.

BRIGHTON UNIVERSAL SERVICE SECTION.

Mr. P. E. BROWNE (Brighton): I take Mr. Westbrook's remark about employing not fully skilled workers rather to myself. Boys were spoken of. When is a boy not a boy? The youths we have in the Brighton and Hove General Gas Company, on what we call our Universal Service Section, are not unloaded on to the public anyhow before they are between seventeen and eighteen years of age. Brighton's Universal Service Section is additional to, and does not replace, our specialized maintenance of appliances. We came to the conclusion, having a lighting burner maintenance scheme, that we were not touching the great bulk of our light users. We were, of course, getting a few. Mr. Lacey told us that he was getting 25 p.ct. to pay something. That is no good at all. You want 100 p.ct. of your light users to be maintained by your service, or it is no good. ["Hear, hear."] My Directors did not consider it was essential to pay a highly skilled workman to maintain, in the main, lighting burners. While they are in the house, our youths clean and adjust the fires and cooking stoves. We do not allow them to touch geysers, circulating boilers, or the more intricate appliances. That we consider, as we always have considered, is specialized work. In Brighton we believe in a combination of general and specialized inspection and maintenance.

The CHAIRMAN: I also was interested in Mr Lacey's remark that 25 p.ct. of the light users had been persuaded to pay for maintenance; and I agree that if we are successfully to deal with this burner question we shall certainly have to give free service to the consumer.

ARRANGEMENT OF DISTRICT WORK.

The CHAIRMAN: Now we come to the point as to whether it is considered better to take one district and deal with it entirely, and then to move the men on to another area, and treat it in the same way, or whether it is preferable to let the same men deal with the same district each time. I think most of us have found it best to pursue the latter course so far as burner maintenance is concerned. Burner maintenance, at any rate with ourselves, means monthly, and sometimes fortnightly, visits. Therefore it is of importance that the consumer should be acquainted with the employee who comes regularly to look after his fittings; and the man can do what is necessary more quickly if he knows the premises.

Mr. W. J. SANDEMAN: I think the procedure must depend upon the circumstances of individual undertakings. In the case of the Croydon Gas Company, we divide our district work up among the various district inspectors, and each inspector has a staff who deal with maintenance. All our records are kept on cards, which are filed at the head office. The cards are forwarded to the district inspectors to deal with; and they allocate the work as they think best. The details are then entered on the cards, which are afterwards returned to the head office, so that we can make sure there that everything is in order and kept up to date. So far as we are concerned, we find that this is the best way to work.

POWERS DESIRED BY LEGISLATION.

Mr. W. W. TOWNSEND: There has been some reference today to legislation. I think that some new legislation is required which will help us in dealing with this maintenance question. What I am suggesting is that we should all have power to specify material and method of fixing of internal fittings. All gas undertakings should be given the power, which water undertakings already possess, of specifying for internal work.

Mr. W. M. CARR: When I spoke this morning of welcoming legislation, what I wished to convey was that I would welcome legislation that would give the gas industry power to charge for maintenance. There should be a fixed service charge for the maintenance which the resolution unanimously passed this morning stated to be essential.

Mr. R. J. ROGERS (Birmingham): With regard to the suggestion that general legislation giving all gas undertakings power to specify material and method of fixing of internal fittings might be of benefit to the industry, it may be interesting to the conference to know that, in connection with

the fitting-up of new premises, during the last seven years we in Birmingham have been able, without legislation, to induce 97 p.ct. of the builders to put in pipes to our specification, and subject to our inspection. If we can carry on by means other than legislation—by persuasion, or even by a little subsidy, if you like—if we can steer clear of the very stringent restrictions which legislation will place upon us, we should do so. We in Birmingham, as I say, have been most successful.

Too Much Hurry Deprecated

Touching upon the qualifications of the men who are to carry out this maintenance work, I may state that we have been carrying out certain maintenance work in Birmingham. We have adopted the policy of doing as much maintenance as we can with our available staff; and we have laid ourselves out to employ the gasfitters regularly all the year round. That is to say, we have no seasonal work; and if the work falls off in the spring or summer, we simply divert men to the various forms of maintenance. In connection with this maintenance question, we must not be in too great a hurry. We have to train suitable men; and this naturally will be a fairly slow process. But it is essential that the men we do put on should be properly trained, whether they be young men of twenty-one or fitters of thirty years of age. It will be a question of gradual development along the lines of which we have heard so much at this conference to-day.

Question to be Discussed at "B.C.G.A." District Conferences.

Mr. GOODENOUGH: I would like to say that I am entirely in accord with the view that we should not go for legislation even in order to secure such useful powers as Mr. Townsend referred to. It is easy to go into Parliament with all your feathers on, but you can never be quite sure how many feathers you will come out with. Every lawyer will tell you to avoid litigation if you possibly can; and I think in the same way any politician will tell you to avoid Parliament. I believe we can get practically everything we want by careful persuasion. The Gas Light and Coke Company for several years past have followed the plan of keeping the whole of their fitters employed all the year through. It is of great value to be able to have your trained men always at your disposal by using them for maintenance of automatic supplies at one time, gas fires at another, and so on—thus keeping the whole body regularly employed. It makes the men much more contented and efficient, and you get far better work all the year round. With regard to the views expressed by Alderman Waddington, we will take care that this resolution is sent to every organization of the industry, and will ask all the District Conferences of the British Commercial Gas Association to make it one of the topics of discussion.

Providing a Staff by Co-operation?

Mr. B. R. PARKINSON (London): Would it be practicable for the "B.C.G.A." to provide a staff of trained maintenance men who could be loaned to small undertakings in turn for carrying out the work we have heard about to-day?

Mr. GOODENOUGH: I think that is a matter rather for voluntary co-operation. We should hardly care to undertake the responsibility for that at the present time.

Bring All Into the Fold.

The CHAIRMAN: If no one else wishes to speak, we had better close our conference. It has been a most useful one. Those present must have obtained a good deal of information that will be of value to them in deciding upon the course to adopt. But, more than that, I think we have got inspiration that will help us to go on and influence our neighbours who may not have got that inspiration to take this matter up as well. In making it universal to all undertakings, we shall be doing everything we can to safeguard the industry as a whole. One or two backsliders can do a tremendous lot of harm in the way of counteracting the good work done by others. I do appeal to all those who are here, and all those who may read the reports of the conference in the Press, to do all they can in their own districts, and wherever they are able to do so, to bring the matter to the notice of those who are not already taking an interest in it, and impress upon them the importance of the subject to the future of the industry. I take it as a great honour that I should have been allowed to preside over the conference.

Mr. JOHN WILKINSON (Nottingham): We have had a most interesting and valuable conference; and I am sure you will agree that this has been to a large extent due to the admirable Chairmanship of Mr. Cowen, to whom, therefore, I have the greatest pleasure in moving a very hearty vote of thanks.

The Industry Must Take Some Responsibility.

Mr. GOODENOUGH: I should very much like to second that, and, in doing so, to stress one more point. The question of responsibility has been raised; and I believe there are a number of people who are feeling anxious on this score. But will those who are considering that matter bear in mind the possible alternative to gas undertakings themselves shouldering this responsibility? If legislation comes because gas undertakings have not dealt with the matter, it is exceedingly likely that powers will be placed, not in our hands, but in the hands of some department of the municipalities which would enable them to interfere in our business, and would bring us into disrepute with our consumers by a setting-up of arbitrary methods—altogether divorced from our principle of voluntary service—which we should all very much deprecate. The gas industry has to take some responsibility in order to avoid very much worse things.

The vote of thanks was carried by acclamation.

THE LUTON SYSTEM OF INSPECTION AND MAINTENANCE.

The Chairman of the Joint Conference on Inspection and Maintenance of Consumers' Appliances asked the speakers not to detail their various schemes, in order to save valuable time. He intimated, however, that a brief outline might be sent to the Press. Mr. W. Phillips, of Luton, mentioned that his Company had recently commenced a maintenance scheme; and the following is a short account of it.

A circular letter (a copy of which is appended) is sent to each consumer four days ahead, notifying the representative's call. On calling, the inspector presents his business card, to gain admittance. He inspects all appliances, service, meter, and fittings, and notes same on a Maintenance Record Card. He gives the consumer advice, carries literature, and generally tries to push business. He may regulate an appliance, but does not do any repairs. He decides what is required to be done to put the installation in order, and makes out a job-card for this work to be carried out. He also records the material required, and in the case of a consumer's own appliance obtains an order from the consumer authorizing the Company to supply it at their usual retail price. The record cards along with the job-cards are handed in to the office each day for attention. On the following day, or as early as possible, these jobs are handed to the fitters for attention.

The work is being done by the ordinary fitting staff, which has been increased to cope with it. Certain of the men have been chosen for this work principally for their manner, workmanship, and general appearance.

The system has been arranged so that only one fitter calls at each house. It is subject to alteration in special cases, but the principle is as follows:

Work to be Done.	Workman.
Overhaul and adjust lighting burner.	Improver (wages £2 per week)
Cooker burner complaint	3rd grade fitter (wages £2 16s. 8d.)
Ditto, and lighting burner complaint	Ditto
Cooker requiring re-lining, or ditto and lighting burner complaint	Ditto
Cooker overhaul, and fire or radiator overhaul	Ditto
Fire and radiator overhaul, or ditto and lighting burner overhaul	Ditto
Hot water appliance overhaul, or ditto *plus* any of the above work	2nd grade fitter (wages £3 0s. 5d. per week)
Repairs to fittings, or ditto *plus* any of the above work	Ditto
Gas engines	1st grade fitter (wages £3 4s. 1d. per week)
Industrial appliances	1st grade fitter (under instructions)

The maintenance inspectors are men who have had previous experience in such work. In future they will be chosen from the first-grade fitters.

The Company do not attempt to repair shoddy fittings. They condemn them and recommend something to replace them. They repair escapes on exposed pipes, but do not undertake to search for escapes, without an order. In the case of a bad escape, the inspector shuts off the supply until some arrangement has been made.

The inspector makes an average of 15 to 20 calls per day. The fitters average 5 consumers per day per man. About 60 p.ct. of the consumers require attention. The Company make a charge only for material for consumers' own appliances.

CIRCULAR LETTER.

LUTON GAS COMPANY.

Distribution Department,
Gas Office,
Luton.

DEAR SIR,—To ensure that our customers shall obtain the most efficient service from their gas appliances, we are introducing a system of periodical inspection of all gas apparatus. The services of our skilled attendants are entirely free, and are wholeheartedly at the command of each of our customers. Where

material is required to carry out a repair, only the ordinary retail price is charged.

Our representative will call upon you on or about . . . . next, when we trust it will be convenient for him to inspect your gas apparatus. He will give you his advice on any appliance not giving entire satisfaction, and, if necessary, will arrange for a special fitter to call and overhaul it.

No charge is made except where material is required, and no chargeable work will be carried out without your written instructions. The cost of all material can be obtained from this office before the work is put in hand.

Will you kindly notify us if the date fixed for our call upon you is not convenient. Our representative will present his business card on seeking admittance, and we are sure you will find him in every way courteous and obliging.

All correspondence in connection with this work should be addressed to the Distribution Superintendent at this office. We trust you will take full advantage of this extended service scheme we have adopted for the benefit of all our customers.

Yours truly,

Engineer and General Manager.

BRITISH INDUSTRIES FAIR.

Record Exhibition at Birmingham.

The British Industries Fair, Birmingham, which is an integral part of the Board of Trade British Industries Fair (organized by the Birmingham Chamber of Commerce), was opened at Castle Bromwich, Birmingham, on Monday, under auspicious circumstances. It will remain open until March 4. As last year, the undertaking is receiving whole-hearted recognition and active co-operation from the Birmingham Corporation; and the Lord Mayor of that city (Alderman A. H. James) attended at the formal opening.

The Birmingham Fair, which represents the heavy industries of the country, is by far the largest industrial exhibition ever held in the Provinces, and the largest to take place under one roof in the country. The area exceeds 6 acres. The enclosed space is 250,000 sq.ft., and 130,000 sq.ft. represents the space taken by stands, of which there are 600, compared with 400 twelve months ago. The three exhibition halls have been so enlarged that the Fair is 33 p.ct. bigger than that of 1926.

The heavy industries have been divided into ten groups. The engineering group are responsible for a co-operative exhibit in the form of a modern boiler house. This is a new and spectacular contribution to the Fair; and the object of it is, of course, to enable industrialists to visualize a thoroughly modern boiler house on practical lines, with each component part in its correct position. Of 114 stands in the power, lighting, and heating group, 85 belong to the electrical industry. A distinguishing feature is an extensive collection of mantelpieces, grates, and interiors, and tile hearths and hearth furniture. Throughout the Fair the British tradition for a high quality standard is well maintained; and full credit is due to the British manufacturer for his determination to cater adequately, and at competitive prices, for the home and foreign markets.

Gas Supply.

It is estimated that the daily consumption of gas, supplied by the Birmingham Corporation Gas Department, at the particular pressures required by exhibitors, will be approximately 150,000 c.ft. In the various kitchens seventy gas cookers and grillers are in use, in addition to fourteen gas heated vegetable boilers and twelve gas heated boilers for supplying water. The Fair is lighted mainly by 1000-c.p. high-pressure gas lamps.

On the Birmingham Corporation stand in Hall "A" there are fixed two "Tilley" gas compressors, each of 1000 c.ft. per hour capacity. They are used for raising the pressure of gas for supplying the 61 overhead high-pressure lamps for the general lighting of Building "A," including the extension. Each compressor is run alternately; the gas being raised in pressure from 3 in. to 60 in.

Birmingham Corporation Research Laboratory.

The general display of gas equipment is not large; and there are not many new features. The Birmingham Corporation Gas Department are again represented by the Industrial Research Laboratory, which on this occasion is located in the engineering trades section. The stand is double the size of last year; this enlargement being necessary in view of the nature of the exhibits, and the fact that demonstrations, on a full practical scale, of heat treatment and testing of metals are given daily. The stand is divided into two sections. One-half is fitted-up in a practical manner as a modern heat-treatment shop, complete with the latest types of gas heated furnaces and equipment, and also demonstrates the different methods of temperature measurement and control. Here a complete range of pyrometric apparatus manufactured by the Cambridge Instrument Company is demonstrated. The furnace plant is set out on a paved floor, and by means of it large quantities of work, including forgings, components of different kinds, and a considerable range of material, will be heat-treated under practical conditions throughout the period of the Fair. This section of the stand includes also a complete oil cooling plant manufactured by Messrs. Heenan & Froude, which is being run in conjunction with the oil cooling tanks installed to effect the cooling of a considerable quantity of oil used for quenching purposes. This cooling unit represents one of the most modern methods of oil cooling adopted in heat treatment shops, and is much more effective than the older types of oil cooling plant depending on the circulation of water. The furnace plant embraces a recuperator type furnace of the most modern design manufactured by Messrs. Gibbons Bros., Ltd., a similar furnace by the Incandescent Heat Company, Ltd., and a small re-heating furnace by Lucas Furnaces, Ltd. There is also a furnace by Mr. J. F. Askham, suitable for re-heating work. Another interesting exhibit on this section of the stand is a solution tank made by Cox's Ignite Combustors (the Metropolitan Fuel Company, Ltd.), which consists of a tank fitted with internal immersion burner, and controlled by means of automatic diaphragm control thermostats. The burner is supplied with town gas and air from a small self-contained blower; and owing to the arrangement of the burner, a high efficiency (over 70 p.ct.) can be obtained. There is also a display of soldering iron stoves and small heating apparatus suitable for use in the hardware trades.

The other section of the stand is devoted to testing machines of practically every type. The equipment of this section includes a 30-ton testing machine by Messrs. W. & T. Avery, arranged for tensile testing, torsion testing, and compression testing; also an impact testing machine of 120 foot-pounds capacity by the same makers. Other plant manufactured by Messrs. Avery includes a hydraulic compression testing machine of 60 tons capacity and a Brinell hardness testing machine; also a Wohler alternating stress machine. On the same section is installed a new type of machine for testing the hardness of material, made by Messrs. Thomas Firth & Sons, Ltd., and known as the "Hardometer." There is also a "Rockwell" direct reading hardness testing machine. The whole of this equipment is so set out that practical demonstrations of the various tests referred to can be given; and arrangements have been made whereby the wares of any exhibitors at the Fair can be tested on the stand. Other demonstrations include the testing of concrete in the form of cubes, and also material such as brick, stone, mortar, &c. Alongside this testing plant is installed a complete range of apparatus for the microscopic examination of metals and other material; and the preparation of specimens for micro examination is demonstrated.

The stand as a whole may be considered as representative of a modern type of heat-treatment shop equipped with all the necessary apparatus, and also a mechanical testing laboratory such as is now usually associated with modern heat-treatment shops, where scientific methods of control have to be adopted right through the whole of the processes of heat-treatment; every facility being offered for demonstrations of the mechanical, metallurgical, and physical testing of materials.

"Glow-Worm" Boilers and Coke Fires.

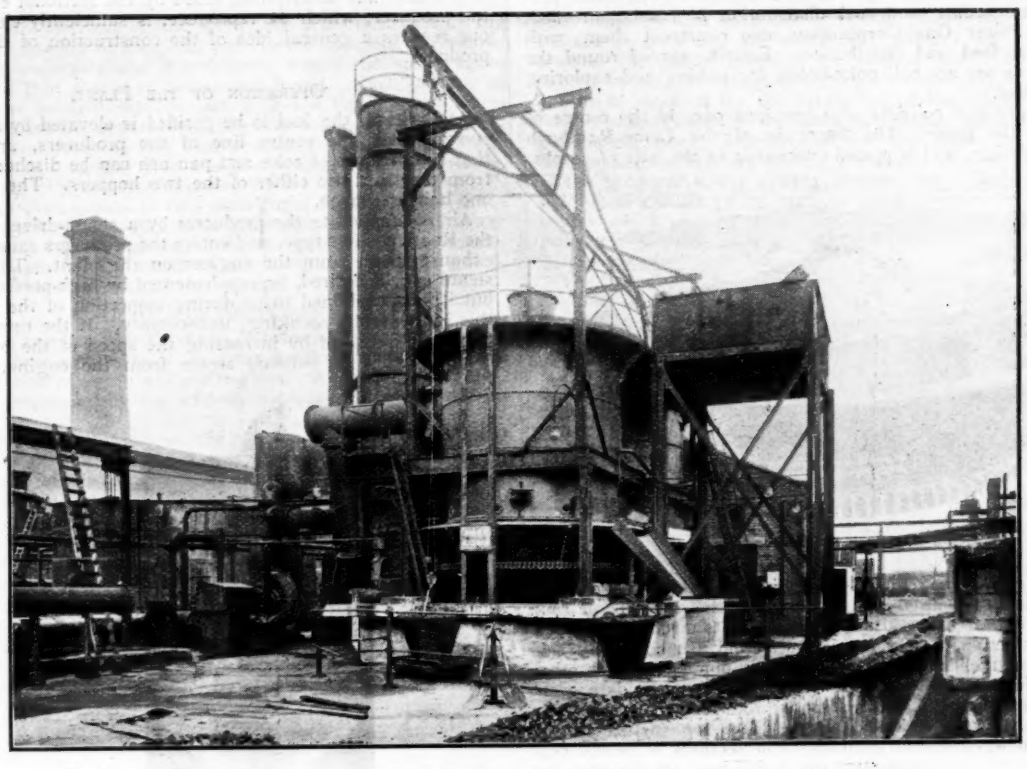
Messrs. O. Bruster & Richardson, patentees and manufacturers of the "Glow-Worm" coke boilers, show a full range comprising the "Miner" and "New Junior" (open-fire boiler) No. 1 and No. 2 size, all of which have established a strong hold on the market. A smaller size "Junior" boiler is also being shown. It is anticipated that this will have a duty of 20,000 to 25,000 B.Th.U.

In addition, three models of the "Glow-Worm" coke fire invented by Dr. Owens are on view. The self-contained type, which was first exhibited at the Smoke Abatement Exhibition at Birmingham last year, has been improved in several ways, and is giving every satisfaction. A larger model has a built-in grate, and is shown in use. This model has a back boiler which is capable of giving a constant supply of hot water, or, alternatively, of heating radiators. A small basket fire of the hearth type is shown, fitted into an ordinary coal grate interior. This form, which needs no fixing, should be very popular. In all these fires the principle of combustion is the same. The air for combustion passes from the front to the back of the fire, and then into the flue at the back. This secures unobstructed radiation of heat into the room, as new fuel added falls to the back of the fire, and does not block-out the radiation. The most important thing that this principle of combustion has established is said to be that a very small amount of air is required for combustion of the coke; and the best results are obtained with these fires when the smallest draught possible is allowed to pass through the fuel. In each model, however, the natural ventilation of the room is entirely automatic, and cannot be interfered with.

(To be continued.)

HEATING RETORT SETTINGS CHEAPLY.

Outside Producers Operating on Pan Ash and Small Coke.

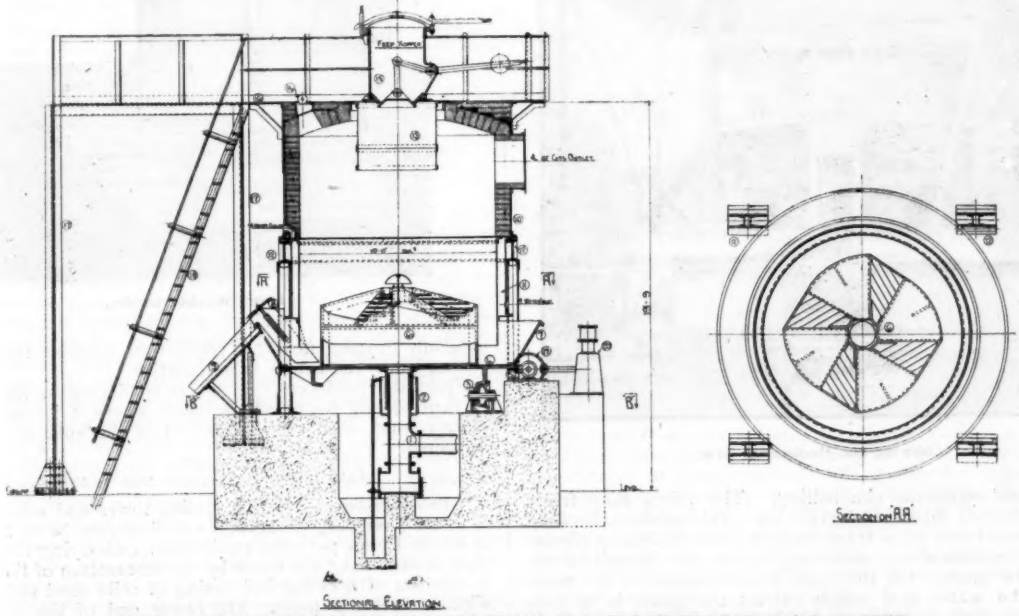


GENERAL VIEW OF THE PLANT.

Recently, through the courtesy of the Gas Light and Coke Company, we had demonstrated to us a most interesting plant for the production of cheap heat. This plant, which is installed at the Company's Chemical Bye-Product Works at Beckton, comprises two gas producers of the water-jacketted type with mechanical grates, manufactured by the Power Gas Corporation, Ltd., of Stockton-on-Tees. Some idea of the efficiency and adaptability of this type of producer will be gathered when it is mentioned that the fuel used in this plant at Beckton is a mixture of pan ash and small coke; the former containing over 50 p.ct. of ash and 8 p.ct. of water, and the latter about 14 p.ct. of ash and 21 p.ct. of water. In other words, half the material charged into the producers is non-combustible; and yet the working results, we were told, are eminently satisfactory, and the plant gives no trouble week in, week out, and requires little labour and attention.

The Producers.

Each of the producers consists of a steel shell in two sections. The lower section comprises a water jacket, the inner wall of which projects below the bottom of the jacket, and dips into a water seal. The water jacket is alternatively constructed as a steam boiler in those cases where steam can be profitably used for works purposes. The diameter inside the jacket is 10 ft. The upper section consists of a steel shell (11 ft. 6 in. inside diameter) lined with 9 in. of firebrick. The diameter inside the lining is thus also 10 ft. These two sections are bolted together, and the complete shell is suspended in the

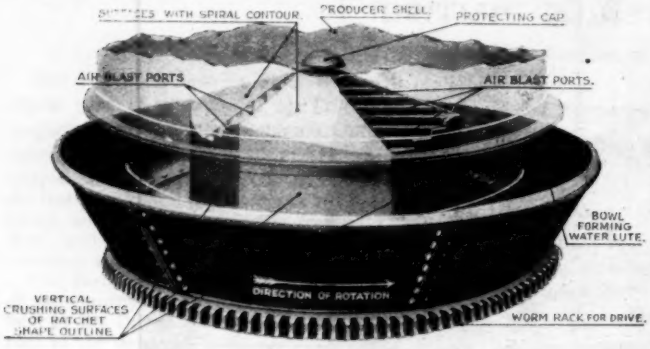


GENERAL ARRANGEMENT OF LYMN-RAMBUSH GAS PRODUCER FOR COKE BREEZE.

1. Air inlet-pipe. 2. Water lute on same. 3. Roller bearings (radial). 4. Ash bowl base plate. 5. Worm rack. 6. Grate. 7. Lute sides. 8. Ash shovel. 9. Ash chute. 10. Producer body. 11. Water jacket. 12. Producer supports. 13. Producer bell. 14. Top pokeholes. 15. Feed hopper. 16. Producer platform. 17. Producer platform supports. 18. Ladder. 19. Friction wheel and lever. 20. Steam cylinder for ash-bowl drive.

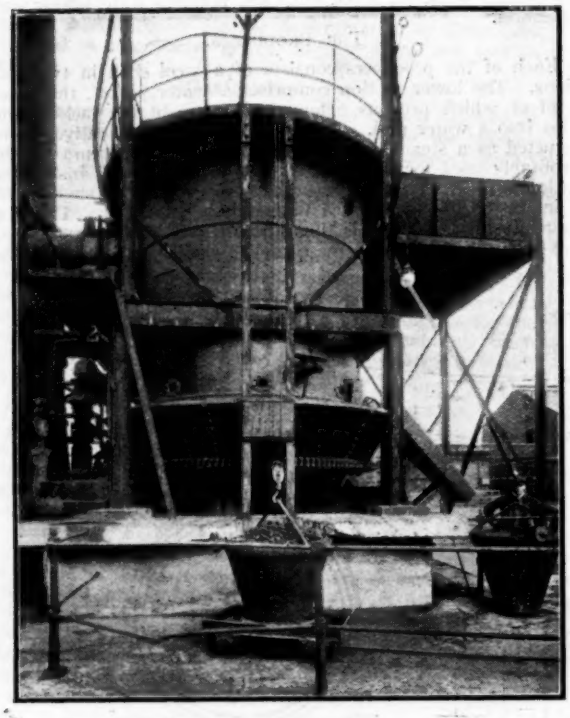
water seal by steel columns. The crown of the producer is of firebrick surmounted by a floor of blue brick. In the centre of this crown is the fuel feeding hopper, below which is suspended, inside the producer, a steel bell. In these producers the feeding and fuel distribution is hand controlled, but the Power Gas Corporation also construct them with mechanical feed and distribution. Equally spaced round the fuel hopper are six ball poke-holes, for poking and exploring the fuel bed.

The water seal consists of a cast-iron pan, in the centre of which is the grate. The latter is of the Lymn-Rambush patented design, and is placed concentric to the axis of revolu-



Lymn-Rambush Mechanical Grate.

tion. It consists of four symmetrically eccentric segments, designed to break up the clinker against the producer at four points during each revolution previous to its discharge into the outer annular space of the water seal and ash bowl. In this construction the strains are diametrically opposed to each other and therefore balanced; this is important, as it avoids a great deal of wear which exists in those producers having a grate involving a single eccentric action. The top surface of the grate is made of several hematite iron sections of helical contour, whereby, on revolution, the lower part of the fuel bed is submitted to continuous, but very slow, vertical movement up and down, which maintains a uniformly compact bed



Showing the Mechanical Gear.

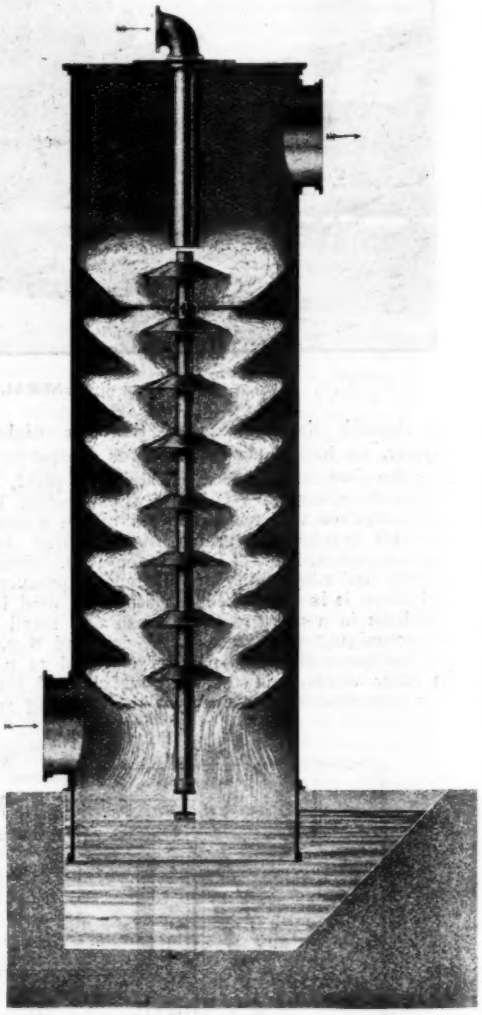
of fuel, and prevents channelling. The ashes flow freely down a series of interlocked grate bars, the openings between which always move away from the fuel, thus preventing clinker or ashes accumulating, and clogging-up the ambushed air ports of the grate. On the outer circumference of the base-plate of the water seal which carries the grate is a rack operated through a worm and friction gearing by a single steam cylinder. The grate and water seal are supported and guided by a series of rollers.

The ash is removed from the seal by a number of inclined adjustable ploughs, by which it is discharged over the side of the bowl into a wagon. The speed of rotation of the grate and the ash bowl is controllable to suit the requirements of the fuel as to ash content and rate of gasification. It is hoped that this description, aided by the sectional elevation of the producer, which we reproduce, is sufficiently clear to give our readers a general idea of the construction of this type of producer.

Operation of the Plant.

At Beckton, the fuel to be gasified is elevated by a skip and runway over the centre line of the producers, arranged so that the mixture of coke and pan ash can be discharged direct from the skip into either of the two hoppers. The skip holds one hopper charge.

Air is supplied to the producers by a steam-driven blower of the Roots positive type, and enters the producers saturated with exhaust steam from the engines on the plant. This exhaust steam can, if desired, be supplemented by high-pressure steam; but it was explained to us during inspection of the plant that this is, generally speaking, unnecessary. If the rate of gasification is increased by increasing the speed of the blower, the extra amount of exhaust steam from the engine, which is



Lymn Washer-Cooler.

naturally running faster, is requisite to saturate the blast; and consequently the action is automatic.

From the producers the gas is conducted to the base of a vertical cooling tower and washer, where it is cooled by intimate contact with cold water. Here the bulk of the dust is deposited.

Gas Cooling Tower and Washer.

A short description of the cooling tower and washer referred to in the foregoing paragraph will doubtless be of interest. It is of the Lymn patented static type, embodying the new principle of atomizing the water by the momentum of the gas itself. It consists of a cylindrical casing of mild steel and cast iron, with a steel top plate. The lower end of the cylinder dips into a water seal. A vertical stationary shaft located in the centre of the apparatus, and extending the whole height of the casing, is firmly secured at top and bottom. At suitable intervals, a series of discs or distributing devices for the liquid is fixed on this shaft; and attached to the casing is a corre-

sponding series of inverted truncated cones which serve as collecting devices.

Falling by gravity alternately from the distributors to the collectors, and *vice versa*, the thin sheets of liquid are atomized, and, in the form of fine spray, are actually driven by the gas—itself flowing in a zig-zag path in the opposite direction—on to the collectors and distributors, where the spray again forms into thin sheets of descending liquid. Each particle of gas is thus brought into contact with the liquid many times before it leaves the apparatus. The distributors are constructed with diameters considerably smaller than the lower diameter of the collectors, and therefore the gas passage is not restricted, and the loss of pressure occasioned is very small.

The gas then passes to two centrifugal fans, which operate either in series or parallel, where the remaining dust and tar are removed. With coke as fuel, the quantity of tar in the gas is, of course, very small. On leaving the fans, the gas is cooled and cleaned adequately for use.

Application of the Producer.

At the Chemical Bye-Products Works at Beckton, the gas made in these producers is used for heating furnaces and for the production of power via gas engines. Regarding the latter, we were impressed by the smooth running of the engines on this gas.

On a gas-works, of course, the producer gas would be mainly utilized for heating the retort settings. The efficient working of the plant with so little attention, coupled with the fact that fuel can be used which would otherwise be either a drug on the market or waste, entitles this type of external producer to careful consideration as a means for making gas for heating the retort settings, and thus saving the valuable coke generally used in the built-in producers.

Results at Beckton.

The fuel used, as previously mentioned, is a mixture of unwashed pan ash and small coke. The analyses of the two materials are as follows:

—	H_2O.	Ash.	Combustible Matter.
Pan ash, p.ct.	8·7	53·1	38·2
Small coke, p.ct.	21·0	14·0	65·0

The average amount of this mixture fed to each producer is 14·4 tons a day; the maximum being 20 tons. The quantity of gas made per pound of combustible material is 100 c.ft.; and its analysis is as follows: CO_2, 6; CO, 25·5; H_2, 10·5; CH_4, 0·2 p.ct. It has an average gross calorific value of 125·3 B.Th.U. per c.ft. N.T.P., or 116·9 B.Th.U. per c.ft. at 60° Fahr. and 30 in. Hg. Of the volume made, 60 p.ct. is used for furnace heating, and 40 p.ct. for power production. The fans require 10 H.P., and the grate only about 1 H.P. As for the blower, the power required for this is small; and, as previously stated, the whole of the steam consumed in the blower engine is required for the saturation of the blast.

The water used in the producer jacket amounts to 1000 gallons per hour. It enters at 60° and leaves at 150° Fahr. This water—which, by cooling the metal surface of that zone of the producer where clinker usually forms, prevents the adherence of clinker to the walls of the producer—provides a hot supply which may be used for boiler feed or for other heating purposes. It may also provide, if necessary, the steam required for blast saturation.

The ash discharged from the producer is small in size, and contains only 5 p.ct. of carbon. As for the labour employed on the plant, only two men are required per shift.

Gasifying Coke Breeze.

We will conclude this article by giving the results obtained on an older type of producer, of the same firm's manufacture, when gasifying vertical retort breeze. The makers claim that the fact that it will do this efficiently shows that, if the producer is employed for making gas for heating the retort settings in a gas-works, there would be more coke for sale, and breeze would cease to be a bugbear.

Grading of Fuel.

	P.Ct.
Over ½ in.	27·6
Between ½ in. and ¼ in.	33·1
,, ¼ in. ,, ⅛ in.	19·3
Below ⅛ in.	20·0

Analysis of Fuel.

	P.Ct.	
Moisture	14·29	
Ash	22·33	On dry sample.
Volatile matter	5·10	
Total carbon	74·45	
Calorific value	11,109 B.Th.U. per lb.	

Analysis of Gas Made, P.Ct.

CO_2, 6·4; CO, 25·0; H_2, 14·0.

Calorific value gross, 133·6 B.Th.U. per c.ft. at N.T.P., or 125 B.Th.U. per c.ft. at 60° Fahr. and 30 in. Hg.

Gas made per ton of wet breeze, 110,000 c.ft.

Ash: 87·3 p.ct. of incombustibles; 10·7 p.ct. of carbon.

WESTERN JUNIOR GAS ASSOCIATION.

On Saturday, Feb. 5, the Association inspected the showrooms and stove and meter workshops of the Weston-super-Mare Gas Company. They were received by Mr. J. Taylor and Mr. T. W. Luckhurst, respectively the Engineer and the Secretary of the Company. After the inspection, the visitors were entertained at tea by the Directors of the Company.

Mr. C. Bateman (President of the Association) thanked the Directors and officials of the Company; and Mr. Taylor and Mr. Luckhurst replied. Thereafter a paper, of which the following is an extract, was read.

METERS.

By S. S. Lloyd, Distribution Superintendent of the Weston-super-Mare Gas Company.

[Extract.]

The accuracy and the reliability of a meter do not depend upon its age. In fact, I have had instances of new meters, stamped by a Government Inspector, which have proved defective. In one case, a meter was reported to me for special investigation, but when tested in the usual manner it was found to be accurate so far as a reading by the test dial was concerned. Further observations proved that the hundreds finger did not move, due either to a faulty cog or to an index wheel being out of position. A similar case also came to my notice recently. In this instance a finger of the centre dial was missing, thereby preventing the complete reading of the gas consumption. It is imperative that gasfitters should be instructed to handle meters carefully. External damage may considerably affect the accurate working of the meter as regards both registration and flow of gas. Every meter brought away for testing purposes should immediately be tightly corked on removal, otherwise the contact of the air with the inside of the meter may entirely upset any accurate comparison.

I have given you examples of practically new meters being at fault. I will now go to the other extreme, and show you that old meters may give great satisfaction, especially when fixed in satisfactory positions. One case worthy of note concerns a meter in Weston-super-Mare. This meter has been in use in one position since 1894. It supplied a small cooker, and was a 3-light one of a capacity of 18 c.ft. During the late coal strike, owing to the fact that the consumer had two gas fires fixed, the meter was changed for one of a larger size. Being interested in the date of manufacture and the length of time it had been fixed in the one position, I tested it, and found that, after 32 years' working, it was within the limits for accuracy, and was quite sound. After testing, I had the meter opened, and found the internal parts, and especially the diaphragms, in splendid condition. This shows that a meter's reliability does not depend on its age, but on the conditions under which it has worked.

Keeping a meter standing idle without being corked causes the diaphragms to become hard. Many methods have been tried for treating the leathers to give them a longer life. To overcome this hardening of the leathers, and to keep the valves in good working order, a special arrangement has been invented whereby valves and diaphragms can be oiled. This remedy is a step in the right direction, especially for meters which have to be fixed in unfavourable positions.

Overtaxing Meters.

Dry meters are capable of passing much more gas than their rated capacities; and it may be found in some cases that a meter has to pass 100 or 150 p.ct. more gas than is normal. If excessive demands are frequently made upon a meter, I consider that its accuracy will soon be impaired and its effective life shortened. It is important to keep in mind also that, when an excessive amount of gas is passed through a meter, an excessive resistance to the flow is given by the meter. In hilly districts or in situations near the gas-works, where there is usually an ample pressure of gas in the mains, the consumer may not suffer any serious inconvenience by this absorption of pressure; but in outlying or low districts, this loss of pressure would be serious. For this reason it is most important to ensure that the capacity of the meter is equal to the maximum demand anticipated.

A further point to be borne in mind is that, when an excessive amount of gas is passed through a meter, the latter always registers slow—that is, against the gas company. If this only occurs once a month, it may not be a matter of great importance; but if it is likely to occur every day, or for several

hours a week, it is obvious that the loss of revenue to the gas company may be considerable.

STANDARD METERS.

By enlarging the passages and diaphragms, as in the new standard meter, a much freer action takes place. This reduces the resistance of the meter, and enables it to register more correctly, thus giving a larger capacity per hour without increasing the size of the case.

HIGH-CAPACITY METERS.

Some meter manufacturers have extended the work done in manufacturing "standard meters" by putting on the market what they term "high capacity" meters. I have had no personal experience with them, but understand that the gas-ways have been further improved and enlarged, and that, with a similar size case, they are rated to pass double, or more than double, the amount of gas for which the standard meter is rated.

The following figures may be interesting:

Size of Case.	Rated Capacities.		
	Ordinary.	Standard.	High Capacity.
Light.	C.Ft.	C.Ft.	C.Ft.
5	30	60	120
10	60	120	240
60	360	420	1200
150	900	900	3000

The speed at which these meters work is greatly increased, as you will see from these figures:

Size of Case.	Revolutions per Hour.		
	Ordinary.	Standard.	High Capacity.
Light.			
5	180	240	360
10	192	240	320
60	217	210	300
150	180	150	240

It is a point of interest that the larger sizes of the old type meters have always been rated too high—that is to say, they have had to work at excessive speeds in order to pass their registered quantity of gas. This is shown by the fact that a 3-light meter had to work at 144 revs. per hour for its rated capacity, a 40-light at 240 revs., and a 60-light at 225 revs.

It is generally considered that any large piece of machinery should work at a slower speed than a smaller machine of a similar type; and I think it is obvious that the high speeds of these meters were undesirable. Whether the high speeds ranging up to 360 revs. per hour of the high-capacity meters will prove satisfactory in practice, remains to be seen. If they are installed for short period demands—for geysers, for example—they may be satisfactory, but I do not know whether they would be equally satisfactory if they had to work at full speed for long hours, as in the case of gas fire supplies for suites of offices.

An advantage offered by the high-capacity meters is worth noting. They are fitted with side connections; and this should be a distinct benefit when they have to be fixed in confined situations, such as on a high shelf close under a ceiling, or under one of the lower treads of a staircase.

MAXIMUM FLOW OF GAS THROUGH METERS.

I have made a large number of tests to ascertain how much gas can actually be passed through various meters. The conclusions I have come to are that a meter may for a short time be called upon to pass double the amount of gas it is normally expected to pass, without any serious disadvantage. It is possible to get six times the proper quantity through many meters; but the registration usually becomes inaccurate, and always slow. A further point—and a most important one—is that the pressure absorbed by a meter working at more than twice its proper speed is considerable. One test I made of a standard meter working at three times its proper speed showed that 23-tenths of pressure was taken up by the meter. Though this amount is exceptionally high, from 12-tenths to 20-tenths are common, whereas at double the normal speed not more than 5-tenths is generally absorbed. It is most unwise to fix meters which are too small for their work; and I should advocate that a meter ought to be equal in its rated capacity to the maximum consumption which is ordinarily to be expected. For example, in a house fitted with a cooker burning (say) 50 c.ft. per hour, three gas fires at 30 c.ft. per hour each, and a geyser at 90 c.ft., it would be extravagant to fix a No. 5 standard meter, capacity 210 c.ft., to meet a total possible demand of 230 c.ft. The case would be amply provided for by fixing a No. 4 standard meter having a normal capacity of 210 c.ft., which would be equal to the consumption of two gas fires and the cooker. The contingency of the geyser having to be supplied in addition to the two gas fires and the cooker would seldom occur; but the meter would deal with it in a capable manner.

Meter Tests—All at 50-Tenths Inlet Pressure.

Meter No.	Loss of Pressure. Tenths. 1	2	3	Accuracy. P.Ct. of Error. 1	2	3	Revs.
Gas Passed. C.Ft.							
30	2	2	2	− 1·48	− 1·96	− 1·48	180
60	2	3	4	− 0·50	− 3·38	− 2·91	360
120	12	13	8	− 2·91	−11·11	− 5·66	720
180	20	18	14	− 3·85	*	−11·11	1080

* Considerably over 11 p.ct. slow.

Meter No.	4	5	6	4	5	6	
C.Ft.							
60	4	4	4	0	0	0	240
120	5	4	4	0	0	− 1·96	480
180	6	4	7	− 1·48	− 4·76	− 1·96	720
240	12	12	9	− 2·91	− 6·98	− 2·91	960

Meter No.			7			7	
C.Ft.							
80			2			− 2·04	240
160			17			− 1·48	480
240			23			− 1·96	720

Meters Nos. 1, 2, 3 were ordinary 5-lt., capacity 30 c.ft. per hour.
" " 4, 5, 6 " No. 3 standard, " 60 " "
Meter No. 7 was No. 3A " " 80 " "

Where a meter is taking a heavy pressure of gas to work it, as in the case of the standard meter, which in my tests was so overworked as to absorb 23-tenths, it is important to bear in mind that there will be this difference of pressure on the two sides of the leather diaphragms. The latter are not calculated to withstand such a strain, and would doubtless soon give way under it.

In gas showrooms, it is advantageous to have a glass-cased meter showing the internal parts. This meter ought to occupy a prominent position, and be connected to a gas supply, so that when need arises a consumer may have a demonstration of its working, to show that no gas can be registered unless it passes through the proper chambers in the meter.

FLATS.

A large number of houses in Weston have been converted into flats during recent years. We have, unfortunately, had some cases where the upper portions of a house which had been divided in this manner were supplied with gas through "check" meters, to avoid the trouble and expense of running separate services to each flat. In certain cases it has been found that the difference of temperature due to the main meter being in a cold cellar and the check meters being in warm rooms has been so considerable as to create a perplexing problem of how to reconcile the difference. Every 5° Fahr. drop in temperature reduces the volume of gas passed by a meter by 1 p.ct. It is most desirable that cold, damp cellars or other exposed situations should, therefore, be avoided as far as practicable in fixing meters.

It is now our practice that all flats must have their own services and main meters. In most cases we are able to run a large service pipe up the outside wall of the building, and to take off branch connections for each flat at the proper level.

INCORRECT REGISTRATION.

One of the regular jobs in a gas distribution department is the investigation of cases where the registration of consumers' meters is doubted. Many perplexing situations arise, and many instances in which considerable tact is required. It must always be borne in mind that the meter stands in the same relation to the public as the scales of a tradesman; and the public should be impressed by our desire to give a fair deal, and to prove to their satisfaction, as well as to our own, that the meter is as reliable and as accurate an instrument as the tradesman's scales.

When suspicion of a meter's registration is reported, it is desirable to have a test made *in situ* by the aid of a portable test meter. The tests should always include a determination at small flows—say, 5 c.ft. per hour—to detect whether the meter will pass small quantities without registering. It is possible for a meter to pass small flows without registering, and to register within the limits of accuracy with its full quantity passing. If possible, it is a wise plan to get the consumer to watch the test, as this is usually helpful in allaying his suspicions.

During the last two years, our tests of doubtful meters have resulted as follows:

Correct	172
Stopped	194
Slow	87
Fast	62
	515

Thus, 66 p.ct. of the meters reported doubtful were actually incorrect, and 54 p.ct. of the total tests proved the meters to be in favour of the consumer.

Discussion.

Mr. CONWAY (Bristol) proposed a vote of thanks to Mr. Lloyd.

Mr. ARMITAGE (Cheltenham), in seconding the vote, said that at Cheltenham it had been decided to do away with all 3-light meters. Of 1000 taken out and tested, 500 were found to be 4 p.ct. fast, and 500 11·5 p.ct. slow. Many tested at 6 c.ft. per hour did not register at all. Mr. Lloyd had stated that many services to flats had been fixed on the outside of the walls. The speaker asked whether any trouble had been caused by this procedure.

The PRESIDENT asked what dressing was used on meter diaphragms. At Bath the 3-light meter was a thing of the past. In the case of services on the outsides of flats, how were escapes detected?

Mr. PATERSON (Bath) said he had found many meters damaged through rough handling by the fitters. Slow meters were a source of loss in revenue, and increased the unaccounted-for gas figures. He asked whether the higher pressure in present-day practice had anything to do with the life of diaphragms.

Mr. HOLE (Bath) stated that meter diaphragms were treated with almond oil as a preservative. This was costly. Had the present-day substitutes the same preserving properties?

Mr. LLOYD, in reply, said that about 100 services, painted with a bitumastic solution, had been fitted outside the walls of flats. No complaints had been received, and the advantages were:

(*a*) Easy fitting, and a great saving in time and money; (*b*) each flat could be supplied at the best and the most accessible point; and (*c*) any flat could be cut off if necessary. In the case of meter diaphragms, almond oil was used. One of the substitutes used to-day was whale oil.

NOTES ON NEW BOOKS.

TREATISE ON THERMODYNAMICS.*

In these days the simple word therm, or its compounded forms, must necessarily be attractive to the gas engineer and chemist, when it is the subject title of a new book. The present work is the third English edition translated from the seventh German edition; the second English edition being simply a reprint of the first.

Dr. Planck, Professor of Theoretical Physics in the University of Berlin, is probably the greatest living authority on thermodynamics; and his dicta are largely quoted in ordinary text-books on physics. The list of original papers on this subject contributed by him to scientific societies is a formidable one. The English translation first appeared in 1903, and there, as in the latest edition, the book is described as "an introductory text-book on thermodynamics for students who have taken elementary courses in physics and chemistry, and are familiar with the elements of the differential and integral calculus." It must be said, however, that unless the reviewer is greatly under-rating the mathematical ability of the average scientifically trained engineer or chemist, such a reader will require to apply himself very studiously in order to master some of the chapters of the book. Needless to say, this study will be well rewarded. As compared with the 1903 edition, of which the reviewer is proud to possess a copy, there is not a large addition in bulk—only a matter of 25 pages. Among the addenda may be mentioned the new theory of the lowering of the freezing point of strong electrolytes as developed by Gosch. This theory appears to explain the deviations from Ostwald's dilution law which were formerly so puzzling. The last chapter is a very important addition, being a new exposition of entropy. The contents of the book are divided into four parts: I. Fundamental facts and definitions; temperature; molecular weight; quantity of heat. II. The first fundamental principle of thermodynamics; general exposition; applications to homogeneous and non-homogeneous systems. III. The second fundamental principle of thermodynamics; introduction; proof; general deductions. IV. Applications to special states of equilibrium; homogeneous systems; system in different states of aggregation; system of any number of independent constituents; gaseous system; dilute solutions; absolute value of the entropy; and Nernst's theorem.

The work of translation has been in the best of hands, and appears to have been carried out in an excellent manner.

W. B. DAVIDSON.

* "Treatise on Thermodynamics," by Dr. Max Planck. Translated by Prof. Ogg, of Capetown; published by Longmans, Green, & Co., London, 1927; price 15s. Pp. 297.

Waste-Heat Recovery.—The subject of waste-heat recovery is to be introduced for discussion by Major William Gregson at an informal meeting of the Institution of Mechanical Engineers, to be held at Storey's Gate, S.W., at 7 o'clock on Friday next.

"Clean Milk."—This is the title of the latest issue (No. 155) of "A Thousand-and-One Uses for Gas" published by the British Commercial Gas Association. It explains how gas and coke can help to assure a supply of clean milk. The illustrations are, as usual, exceedingly good. One depicts the bottle-washing machines in the main depôt of Messrs. R. Higgs & Sons' Dairies, Ltd. Each of these machines is capable of washing, sterilizing, and drying 3600 milk bottles an hour. Steam for heating water and soda water, and also for sterilizing and drying the bottles, is provided by a gas boiler. Gas is also employed for superheating the steam used in drying the bottles. With this system, the bottles are not touched by hand.

Federation of British Industries.

Representatives of the Federation attended the National Fuel and Power Committee on Jan. 27 to discuss the report of the Fuel Economy Technical Sub-Committee recently submitted to the Government Committee. The inception and organization of the Federation's Fuel Economy Department was outlined. A meeting of the Coal Committee was held on Jan. 12 to consider the reports issued by the Departmental Committee on Co-Operative Selling in the Coal Industry. The proposals in the reports were carefully considered by the Federation, and it was felt that at the present stage the question of co-operative selling was one for the coal industry itself, and that the Federation should take no action in the matter. Representatives of the Federation attended an informal discussion at the Board of Trade, to consider the possibility of stimulating interest in the question of simplification and standardization. The matter will be explored by the staff in conjunction with the British Engineering Standards Association.

Corrosion of Metals.—On Wednesday evening, March 2, before the Royal Society of Arts, a paper on "The Corrosion of Metals at Joints and Crevices" will be read by Mr. Ulick R. Evans, M.A., member of the Corrosion of Metals Research Committee, Department of Scientific and Industrial Research.

Safety in Mines Research Board.—A report on the "Support of Underground Workings in the Coalfield of Yorkshire, Derbyshire, and Nottinghamshire—Safety in Mines Research Board paper No. 30, H.M. Stationery Office, Adastral House, Kingsway, London, price 2d. net (4d. including postage), or 6s. 3d. for 50 copies (9s. 3d. including postage)—has just been published. This paper is the third report of the Committee appointed to investigate methods of reducing the number of accidents due to falls of ground in coal mines. The Committee are making a study of timbering practice in certain coalfields, and have dealt with South Wales and Scotland in earlier reports. In the present report the Committee give descriptions (including many sketches) of the usual methods of supporting the workings in the East Midland coalfield, and draw attention to points that may be commended or criticized. All aspects of the problem of supporting the workings and preventing accidents from falls of ground are discussed; and many suggestions are made for the improvement of practices at present followed at some of the mines. The report will be found of value to those concerned with mine timbering in other districts besides the East Midland coalfield.

M.I.T. Students at Tide Water Oil Company.—The first group of students to attend the newly-established Field Station at the Tide Water Oil Refinery, Bayonne, N.J., have just completed their work. The station, which was opened last October, is conducted by the Fuel and Gas Engineering Department of the Massachussetts Institute of Technology, and is one of their three stations; the other two being located at the Iroquois Gas Corporation and Bethlehem Steel Company, Buffalo, and the Cambridge Gas Light Company, Mass. Attendance at all these stations is a required part of the work in the Fuel and Gas Course at the Institute. The students spend full time for six months studying the various plants and making special tests of considerable value to themselves and to the co-operating companies. Some of the more important tests just completed are: "A Heat and Material Balance of the Carbonization Plant of the Iroquois Gas Company," "Fuel Consumption of Coal Carbonization Retorts, and Study of Proposed Waste-Heat Boiler Installation at the Cambridge Gas Light Company," and "A Heat and Material Balance on a Battery of Continuous Stills at the Tide Water Oil Refinery." All the field work is conducted under the close supervision of a member of the Institute Faculty in residence at each station. Both the Tide Water Company and the Institute officials are pleased with the success of the new station.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Case of the Isolated Students.

SIR,—For some time past I have followed closely the various references to students under the Institution of Gas Engineers' Education Scheme; and having been called upon to assist and advise prospective students from my works, I have recognized that some radical change or modification is necessary if students are to be attracted, as desired, from isolated districts.

As a result of my inquiries, I can endorse the letter of Mr. Arthur Coe in your issue for Feb. 16. He has set forth the difficulties in excellent form; and I feel sure that many intending students who had their views, but could not express them, will be grateful to him. In particular, I agree with, and endorse without qualification, the sixth, and last, paragraph of the letter.

There is no question as to the high qualifications desired in students for the gas profession, or of the high qualifications of those who have spent so much valuable time in drafting the scheme to obtain the desired results. But I do suggest they have overlooked the facilities for, and personal cost to, about 75 p.ct. of the prospective students of the gas undertakings in the country, and have in effect catered for certain favoured areas only. Hence the relatively poor response.

I feel sure that it is only necessary for this matter to be viewed on the lines suggested in Mr. Coe's letter, and that if sufficient representation is made by the Junior Associations, and others not directly connected with any Association, in the right quarter, those responsible for the scheme will be only too glad to modify it in such a manner as to encourage every young technical assistant on either the manufacturing or the distribution side of a gas undertaking.

J. F. TYNDALL,
Manager.

Deal and Walmer Gas Company,
Feb. 17, 1927.

The Cost of the Richer Gas.

SIR,—Will you do me the favour to induce by exhortation some one or other of your readers to solve the following problem?

We are making, per ton of coal, by complete gasification (say) 200 therms of gas of a quality of (say) 180 B.Th.U. per c.ft., and we are anxious to enrich this quality up to 200 B.Th.U. The volume per ton is 115,000 c.ft. The cost per therm is (say) 2d.

What is the best process for such enrichment, and what is its cost in capital outlay and per therm of 180 B.Th.U. gas? In other words, what will a therm of 200 B.Th.U. gas cost in addition to the 2d. it at present costs in the 180 B.Th.U. quality?

GEO. HELPS.

Gas-Works, Nuneaton,
Feb. 15, 1927.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Standing Orders applicable to the following Bills have been complied with: Birmingham Corporation, Bognor Gas and Electricity, Commercial Gas, Coventry Corporation, Farnham Gas and Electricity, Leeds Corporation, Manchester Corporation, Matlocks Urban District Council, Reading Gas, Salford Corporation, Scarborough Gas (Consolidation), Smethwick Corporation, South Staffordshire Mond Gas, Stoke-on-Trent Corporation, Wallasey Corporation, and West Bromwich Corporation.

Coventry Corporation, Salford Corporation, and Wallasey Corporation Bills: Presented, and read the first time.

Bognor Gas and Electricity, Commercial Gas, Scarborough Gas (Consolidation), and South Staffordshire Mond Gas (Consolidation) Bills: Presented, read the first time, and referred to the Examiners.

Petitions against Private Bills.

Petitions have been deposited against the following Bills: Commercial Gas, by the West Ham Corporation; Bognor Gas and Electricity, by the Bognor Urban District Council and the Westhampnett Rural District Council; Scarborough Gas, by the Scarborough Corporation; South Staffordshire Mond Gas, by the Tipton Urban District Council.

HOUSE OF COMMONS.

Progress of Bills.

Birmingham Extension, Manchester Corporation, Stoke-on-Trent Corporation (Gas), and Matlocks Urban District Council Bills: Read a second time, and committed.

Farnham Gas and Electricity, and Reading Gas Bills: Read a second time and referred to the Examiners.

Local Authorities (Enabling) Bill.

The Local Authorities (Enabling) Bill, which was presented by Mr. Charles Edwards, and read the first time on Friday, Feb. 11, has for its objects "to extend the powers of local authorities in matters of finance and municipal trading."

MISCELLANEOUS NEWS.

COMMERCIAL GAS COMPANY.

ANNUAL ORDINARY MEETING.

The Annual Ordinary Meeting of the Company was held last Thursday, at the Cannon Street Hotel, E.C.—Mr. W. G. BRADSHAW, C.B.E. (the Chairman), presiding.

The GENERAL MANAGER AND SECRETARY (Mr. F. J. Bradfield) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

THE DIRECTORATE.

The CHAIRMAN, on rising to move the adoption of the report and accounts, said: Before I deal with the events and accounts of the past year, there is one matter to which I must briefly refer. You will have noticed in the report a paragraph with regard to the change in the Directorship. The Hon. Kenneth Mackay, who has been a Director of the Company since January, 1924, on account of increasing responsibilities and demands on his time, has been reluctantly obliged to resign his seat on the Board; and the Directors had no alternative, owing to the circumstances, but to accept his resignation, which they did with very great regret. You will also have noticed that, in conformity with the Acts of Parliament regulating the Company, they have elected Dr. Charles Carpenter to fill the vacancy then created. Dr. Carpenter needs no introduction. As you are aware, he is the President of the South Metropolitan Gas Company, and occupies a position which is without parallel in the gas industry.

My colleagues and I are of opinion that we, as Directors, and you, as proprietors of the Company, are exceedingly fortunate in securing Dr. Carpenter's services; and I am sure you will join with me in welcoming him to our counsels. [Applause.] His name will be before you in a later resolution as one of the three Directors who retire by rotation and who offer themselves for re-election; and I have little doubt that your appreciation of the Company's good fortune will be expressed in an appropriate manner.

THE COAL STOPPAGE.

Reviewing the events affecting the gas industry for the past year, you will agree that the coal stoppage is pre-eminent. Notwithstanding the efforts of the Government during the autumn of 1925 and the spring of 1926 to promote peace in the mining industry by the appointment of a Committee of Inquiry and the payment of an enormous subsidy, the mine owners and the miners failed to come to a settlement of their dispute. The miners stopped work on May 3, a General Strike was declared on the following day, and, notwithstanding its collapse after ten days, the miners remained out for a period of seven months. It is not necessary for me to say much on the effect of the dispute. It is all so recent, and you are as well informed on the matter as I am. I must, however, speak of the effect on the Company's affairs. The Company, at the beginning of last year, was in a very satisfactory position with regard to its supplies of coal. During the year 1925 the Directors had departed from their usual custom of contracting for one year, and had bought ahead for a second year at reduced prices. By combining the two series of contracts, the cost of the coal, for the latter part of 1925, was reduced in a moderate degree, but the greatest benefit would, but for the stoppage, have been felt during the past year. The Directors had also completed a satisfactory arrangement for the freightage of the coal, and there was every prospect of a profitable year which would lead to a reduction of the price of gas and an increase in the dividend of the shareholders. As the date on which the miners had decided to stop work approached, it became more and more apparent that there would be no agreement; and every reasonable precaution was taken to maintain the supply of gas by the increase of the stocks of coal and oil. It was thought that the stocks in hand (we had 29,000 tons of coal and 466,000 gallons of oil) would be sufficient to carry the Company through any strike period. This proved to be a false hope; and the purchase of foreign coal became imperative. The precautions that had been taken, however, enabled the Directors to purchase well ahead; and at no time was there any serious anxiety of a shortage of gas. Altogether 98,600 tons of Westphalian coal and 71,500 tons of American coal were purchased. The average price into the Company's works was 42s. 4d. per ton. It is gratifying to know that this average price compares very favourably with the average price paid by other gas companies.

AMERICAN AND GERMAN COAL.

Just one word about the quality of the coal. The American coal, which was the most expensive, proved to be excellent gas-making coal; it gave a good yield of gas—in fact, better than the best English coal—and the coke was good. It yielded a normal quantity of ammoniacal liquor, but rather less tar. The German coal first delivered, though not so good as the American, had some points in its favour when compared with English gas coal, one of which is that it was found to be up to specification. This is rarely the case, I regret to say, with English coal. Another fact brought to light by the pur-

chase of German coal is the promptitude with which, in normal times, vessels are loaded and dispatched at Rotterdam. I cannot help thinking that, unless there is some improvement in the service in the Tyne, more purchases of gas coal will be made on the Continent. With regard to the later deliveries, it would be best to draw a veil. When the rush came, the German Syndicate evidently oversold, and some of the cargoes received could hardly be described as coal. It had to be accepted, however, as no other coal could be obtained; and it must be acknowledged that, averaging the good coal with the bad, and taking into consideration the lower cost, the German coal was a more economical proposition than the higher-quality, but more expensive, American coal.

Price of Gas.

It will, I am sure, be quite evident to you that the heavy expenditure on coal necessitated the price of gas being raised. As the Report of the Directors states, the price was increased from 9·4d. per therm to 9·8d. per therm at Midsummer of last year, and was further increased to 10·4d. per therm as from Christmas last. The last increase, however, had no effect on the accounts under review, which include only the 0·4d. increase since June last. The value of this increase is about £30,000. The increase in the cost of coal for the six months, as compared with the corresponding six months of 1925, was £108,825, and the increase in the cost of net coals—*i.e.*, after deducting the increase in the amount received for residuals—was £33,659. It will not surprise you, therefore, that for the period mentioned there was a deficit on the working, after paying interest and dividends, of £16,917. Fortunately, however, the Company had a surplus of £16,383 on the first half of the year. This surplus almost balanced the deficit on the latter half; and the accounts before you therefore show a deficit of £534 only on the year. In other words, the balance carried forward is less by that amount.

Revision of Standard Price.

By the increase in the price of gas, it became imperative, if the dividend was to be maintained, that an application should be made to the Board of Trade for a revision of the standard price. In July last the Board of Trade, in anticipation of numerous demands consequent on the purchase of foreign coal, simplified the procedure of the application. Our Company was the first to make an application under the revised rules. We asked for a standard price of 12·6d. per therm, having at that date already arranged the purchase of foreign coal supplies for some time ahead. The Board of Trade had, however, apparently decided that the coal dispute would be over in less than six months; and we had to be content with a standard price of 12d. per therm, with liberty to make a further application if the dispute was not over by Nov. 1. As you are aware, the dispute did last longer; and another application was made. As you will see by the report, a further Order was made granting a standard price of 12·6d per therm—the original figure asked for. I should like to pay tribute to the officers of the Board of Trade for the courtesy shown to the Company during the negotiations. Incidentally, I would mention that had no Order been obtained, the statutory dividends payable for the past half-year would have been £5 1s. 4d. and £4 16s. 8d. p.ct. only on the 4 p.ct. and the 3½ p.ct. stocks respectively. With the price of gas at 9·8d. per therm, the statutory dividends payable under the last Order granted (the other Orders being repealed) are £5 17s. 4d. p.ct. per annum on the 4 p.ct. stock, and £5 16s. 8d. p.ct. per annum on the 3½ p.ct. stock.

After careful consideration, however, the Board decided that, in view of the further rise in the price of gas and the necessity to reduce such price at the earliest possible date, they could not recommend higher dividends than had been paid for the previous half-year—viz., £5 6s. 8d. p.ct. per annum on the 4 p.ct. stock, and £5 3s. 4d. p.ct. per annum on the 3½ p.ct. stock. Later on in the proceedings, this recommendation will be submitted to you.

Application to Parliament.

It will be necessary, in order that you may appreciate fully the Directors' reasons for recommending the application to Parliament, to recall the circumstances which led to the passing of the Gas Regulation Act. It is generally agreed that the sliding-scale worked satisfactorily for both consumers and stockholders until the "fatal" year 1914; but during the war period, owing to the greatly increased costs of both material and labour, and the consequent increase in the price of gas, the scale broke down completely. In 1918 the Government passed an Act entitled "Statutory Undertakings (Temporary Increase of Charges) Act." The Act was designed to give relief to undertakings which, through no fault of their own, were deprived of a fair remuneration on the capital invested in the business. Prior to the passing of the Act, a Select Committee had been set up, and evidence taken from the various undertakings. The hearing occupied eight days; and much to the surprise of those who had attended the hearing, and of the industry generally, the Committee recommended that sliding-scale companies should be permitted to pay dividends at a rate or rates equal to one-half of the standard dividends or one-half of the pre-war dividends, whichever was the smaller. These recommendations, however, were slightly improved in the Government Act by the substitution of three-quarters in place of one-half. As the Commercial Company had for several years before the war distributed dividends at the rates of £5 9s. 4d. p.ct. per annum on the 4 p.ct. stock, and £5 6s. 8d. p.ct. per annum on the 3½ p.ct. stock, the so-called "relief" enabled them to pay £3 p.ct. per annum and £2 12s. 6d. p.ct. per annum on the respective stocks. While this relief was welcome in so far as it stayed any further decline, it was, as you know to your cost, quite inadequate. The general investor and the existing shareholder lost faith in the gas industry; and the various capital stocks were sold in the open market at considerably less than half the pre-war value. In this Company's case the market quotation of the 4 p.ct. stock, which in 1914 stood at £107, fell at one time to £47.

Gas Regulation Act.

In 1919 a deputation waited on the President of the Board of Trade, and, as a result of their representations and subsequent negotiations, the Gas Regulation Bill was introduced. The main objects of the Bill were: (1) To restore undertakings to their pre-war earning capacity; and (2) to change the method of charge from volumetric or quantity basis to a calorific or quality basis. (The Bill received the Royal Assent on Aug. 4, 1920.) Application had to be made under the Act to the Board of Trade; and the Company obtained their first Order on April 1, 1921, which fixed the standard price at 15·4d. per therm. Though relief obtained by the Order was delayed by the miners' strike of that year, it proved satisfactory until the year 1924. The market price of the Company's stocks gradually improved, and actually reached a price of £99¾ on the 4 p.ct. stock, and £99½ on the 3½ p.ct. stock. The fall in the costs of material and labour referred to above led to action being taken by the London County Council. On Nov. 8, 1923, the Council gave notice of their intention to apply for a revision of the Company's standard price. The Company were in agreement with the application in principle, and submitted very complete statements which showed that the standard price should be fixed at 12·2d. per therm. The Board of Trade held an Inquiry on March 17, 1924, and on June 30, 1924, made an Order decreasing the standard price to 11·4d. per therm. This price was accepted under protest. It is noteworthy that the granting of the original standard and the revision of that standard followed immediately on the granting and revision of the Gas Light Company's standard price; and the Directors consider, and in fact they are sure, the Company were prejudiced thereby. A comparison of the standard prices granted to the various London and Suburban Companies reveals the fact that the Company's standard price prior to the coal dispute had been increased over the pre-war standard in a lesser degree than any other company. Since the year 1924, however, it has become apparent to the industry that the Gas Regulation Act has not been uniformly successful. It is submitted that the Act has not achieved its purpose by reason of the limitations imposed on the Board of Trade under section 1 of the Act. Under this section the standard price per 1000 c.ft. is translated into the standard price under the new system per therm, and the Board of Trade are empowered to make such addition as appears to them reasonably required in order to meet the increases (if any) in the cost of gas due to circumstances beyond the control of, or which could not reasonably have been avoided by, the undertaking. The method is only effective where no change has taken place in the conditions of the company either in relation to growth, raising of capital, or other circumstances; but as a direct calculation, the fixing of the standard price is more or less a mechanical operation, and fails to take into account many substantial factors, such as increased sales of gas, increased cost of obtaining capital, increased cost of plant and machinery, increasing distribution costs, increasing cost of providing stoves, meters, and prepayment appliances, and enterprise on the part of the company. Another drawback in the procedure under section 1 is the delay that occurs between a rise in the costs of material and labour and the possibility of obtaining a new standard price. A company cannot make an application until it has suffered loss—the price of gas has been raised and the authorized dividend is consequently reduced. This period of loss cannot be less than six months, and in addition it is usually another six months before the new Order is obtained. The damage is done; business, owing to the higher price charged, is prejudiced, the dividend has to be reduced and the stability of the stock is affected. It is submitted that the original purpose of the Gas Regulation Act was to meet an emergency which had arisen. It was necessary that there should be some general legislation that would obviate the necessity of dealing in one session with measures from possibly hundreds of gas undertakings. After seven years, it has become apparent that it does not meet the necessities of all companies, and representations thereon have been made by the National Gas Council to the Government Departments with a view to the revision of the Act; but no action, so far, has been taken. In any event, the uncertainty of tenure under the Gas Regulation Act has convinced the Directors of the Commercial Gas Company that it would be more in the interest of the consumers—and therefore in the interest of the employees and stockholders—to follow the lead given by the South Metropolitan Company in their Act of 1920, which has been so successful, and which has, after five years' working, been approved by Parliament a second time, and given a fresh lease of life. The Directors therefore have every confidence that Parliament will approve the present proposals. The circumstances which I have detailed to you will, I am sure, convince you, as the Directors are convinced, that it will be in the interests of both the consumers and the stockholders to be once again under the direct control of Parliament; and, at the extraordinary meeting which is to follow the present meeting, a Resolution will be submitted giving your approval of the Directors' action in presenting the Bill to Parliament.

Minimum Dividend.

The main feature of the Bill is the adoption of the method devised by the South Metropolitan Company. It provides for a minimum dividend of 5 p.ct. on the ordinary stock, and for the division of surplus profits between the consumers, stockholders, and employees. It is claimed that the method provides a just reward for labour, a fair return for capital, and ensures a supply of gas at the cheapest possible price to the consumers. When the old sliding-scale was introduced in 1875, it was intended to hold the scales fairly between the capitalist and the consumer; and there is no doubt whatever that for a long time it gave general satisfaction. But as the years progressed, it can be shown that, in the case of well-managed companies with a defined policy of economic capital expenditure, the consumers' share has gradually increased and the stockholders' share has, proportionately, gradually decreased. In 1875 the ratio of benefit was 3 to consumers and 1 to stockholders. At the present time the ratio is over 6 to consumers and less than 1 to stockholders. You will realize, therefore, that, apart from the drastic upheaval and collapse of the sliding-scale by reason of the war, the strength of the scale—*i.e.*, the encouragement given for the production of cheap gas, and the value of those small increments of

dividend of 2s. 8d. and 3s. 4d. p.ct. per annum—has been slowly but surely becoming less. The new method has this advantage: Cheap gas and good service encourage consumption, and the scale improves—to an infinitesimal extent, it is true—with the increase in the sales of gas. It is to the employees' interest to produce cheap gas. The whole proposal is designed to encourage labour by giving the workpeople an interest beyond their standard wage; and the true spirit of co-partnership is carried out in the scheme by the statutory recognition of the employees' work and industry, and by bringing them in as the third co-partner—so making the co-partnership of consumer, capitalist, and worker real and complete.

SURPLUS PROFITS.

The method of the division of what are called the "surplus profits" is shown in clause 12 of the Bill. Briefly, it may be explained as follows. Whatever saving accrues to the consumers in the aggregate by a reduction in the price of gas from the basic price is, for the purposes of the calculation, taken to be three-fourths of an amount of surplus profit, which is then divided as follows: The consumers have already had three-quarters of it, the shareholders are given one-eighth, and the remaining one-eighth is allotted to the employees. To put a specific case: Supposing the saving accruing to the consumers from a reduction in the price of gas below the basic price amounts to £15,000, that sum is three-quarters of £20,000. Of this £20,000, £15,000 has already gone to the consumers, and the remaining £5000 is equally divided between the shareholders and the employees, giving them a sum of £2500 each. In the Bill the division is described more elaborately; but the effect is the same. It must be borne in mind, however, that the amounts required for distribution to the stockholders and to the co-partners is dependent on their having been earned, and also on the Directors' decision that the balance standing to the credit of the net revenue account permits the payment to be made. Your Directors are of opinion that the scheme provides security for consumers, stockholders, and employees, and a strong inducement to the managers and employees to manufacture and sell gas as cheaply as possible; and they have every confidence in recommending its acceptance.

GAS SALES.

Now let us turn to the report and accounts, which summarize the progress of the Company during 1926. We are pleased to report that, notwithstanding the restrictions on outside lighting and a heavy fall in the industrial consumption, the sales of gas exceeded those of the previous year by 0·82 p.ct. The low percentage of increase is partly due to the abnormally mild weather which prevailed during the whole of the year. It is the practice of the Company to keep a record of the hourly temperatures; and it may interest you to know that the average temperature in the Company's district during the last three years has been gradually rising. In 1924 the average throughout the year was 53·1°; in 1925, it was 53·4°; and for 1926, it was 54·2°. The total sales of gas reached the record figure of 4,174,383,000 c.ft., or 19,828,320 therms. An analysis of these sales indicates that trade consumption (subject to discount) was 1·65 p.ct. higher, general consumption (subject to discount) was 0·34 p.ct. less, ordinary domestic consumption was 3·98 p.ct. less, prepayment consumption was 4·40 p.ct. higher, and public lighting consumption was nearly 33 p.ct. less. The demand for gas fires and cookers still continues; and last year it was stimulated by the difficulties with regard to coal.

ACCOUNTS.

If you will refer to the accounts, you will notice that the capital expenditure has been increased by £20,839. This is the total charged after deducting certain credits. Actually, £26,962 was expended on a new water gas plant and in part payment for a new gasholder at Poplar Works. New and additional stoves represent a sum of £4968, prepayment meters and fittings £458, and a sum of £129 a balance in respect of the purchase of freehold cottage property. I would mention that the amount charged for stoves and fittings is after deduction for regular rates of depreciation. With regard to the two credits on the accounts, the first, £459, is due to the reduction in the number of public lamp services, and the second, £10,219, represents the proceeds of sale of obsolete steamships. Referring to the revenue account, coals and oil cost more by £86,241; but owing to higher prices coke brought in more by £52,335, breeze realized more by £5021, and tar realized more by £11,861—a total of £69,217. Ammoniacal liquor was less by £4767. Repairs and renewals of plant were more by £21,958; other small variations account for a saving of £4449. The total expenditure less residuals was more by £39,300. Gas, by reason of the higher price and rentals, realized more by £31,531. Bank interest was less by £1545, leaving a net decrease in the balance of profit of £6224. There is, I think, very little more to which attention need be drawn. The balance of profit is £132,041. After adding the balance brought forward from the previous year, and deducting interest on the debenture stock and other interest, which is mainly the interest on the bank loan, and the dividends paid for the previous half-year, there remains a balance of £93,722 available for the payment of the dividend for the half-year to December. At the rates recommended, these will absorb £54,821, leaving a balance to be carried forward to the current year of £38,901, which, as I have already said, is only £535 less than was brought into the accounts at the beginning of the year. In conclusion, I would say that, although the working results, owing to the inferior coal the Company was compelled to use, were not quite up to the usual high standard which our engineers have set themselves, they compare favourably with the results of other companies similarly circumstanced.

STAFF.

My last duty is a very pleasant one; and although I have discharged it annually for many years, I feel no disposition to treat it lightly. As shareholders we owe a debt of gratitude to the competent and enthusiastic body of men who form the staff and workmen of the Company. Time only increases the pride the Directors feel in the loyalty and business capacity of our Managers and staff and the excellent work accomplished by the whole body of workpeople. They are splendidly led by our General Manager, Mr. Bradfield, who inspires the whole staff with his own industry and enthusiasm, and our Chief Engineer, Mr. Williams, to whom also we owe a special meed of thanks; but from first to last, juniors as well as seniors, they are all one in the keenness and ability with which their duties are performed. This last year the special difficulties caused by the coal stoppage have involved extra anxiety for the chiefs, and increased the labours of all. That the Company has come successfully through its troubles is due in very large manner to the devotion to duty and determination of its employees. I am glad to say that the relationship between the Directors and the Managers, the staff, and the workmen is as cordial as ever. I believe that the efforts which the Company is making to promote the physical, mental, and moral welfare of those who serve it are bringing their reward of loyal and energetic service on an ever-increasing scale. I beg to move the adoption of the report and accounts.

Mr. H. W. GELL, O.B.E., seconding, said they all regretted the absence of the Deputy Chairman (Sir Frederick Green, K.B.E.), and trusted that he would speedily recover his health. The Chairman had put forward in a clear manner the various matters of interest to the proprietors. Instead of the Director with the longest service, the newest Director should have been called upon to second the motion; and then doubtless those present would have had the benefit of the experience and knowledge which Dr. Carpenter had brought to bear upon the deliberations of the Board.

APPRECIATION.

Sir ALFRED WARREN complimented highly the Directors and the staff upon the marvellous work they performed during the general strike. It was, he said, not only a matter of congratulation to the shareholders, but it was a matter of considerable satisfaction to the whole body of consumers throughout the Company's area, that, when many public undertakings were prepared to abrogate their position and hand over the conduct of affairs to self-appointed strike committees (with the result that many who were relying upon these public services were denied light and power with which to carry on their businesses), the Commercial Gas Company maintained its activities and ministered to all within its area. This was a matter to which public attention should be called. People heard to-day about nationalization; but some of them were cursed with municipal services which had been proved, notably in this instance, to fail at a vital moment. Being acquainted with the larger undertakings in the borough of Poplar, and knowing that over a period of years some of these big undertakings had been shut-down, to the consequent loss of the Commercial Company, it seemed remarkable to him that the output of gas was being not only maintained, but actually increased. This showed how great had been the efforts of the staff.

Mr. CHAMBERLIN inquired whether the Company made any contributions to hospitals or institutions.

The CHAIRMAN replied that they subscribed to the London Hospital a large sum every year, and from time to time contributions were made to their special funds. The policy followed by the Board was to subscribe to every charity in their neighbourhood from which any of the employees derived advantage.

The report and accounts were then unanimously adopted.

THE DIVIDEND.

On the proposition of the CHAIRMAN, seconded by Mr. GELL, it was resolved:

> "That pursuant to the recommendation of the Board of Directors, a dividend be declared for the half-year ended Dec. 31, 1926, after the several rates of £5 6s. 8d. p.ct. per annum on the 4 p.ct. stock, and £5 3s. 4d. p.ct. per annum on the 3½ p.ct. stock of the Company, in both cases less income-tax, payable on the 18th of February; and that warrants for the same be forwarded by post to the proprietors."

RE-ELECTIONS AND VOTES OF THANKS.

The CHAIRMAN proposed the re-election of the retiring Directors, Sir Frederick Green, Mr. Stanley H. Jones, and Dr. Charles Carpenter. All, he said, were just the Directors such a Company needed. They deemed themselves indeed fortunate in having Dr. Carpenter to join the Board.

Mr. A. M. PADDON seconded the motion, which was carried.

Moved by Mr. W. GROVES, and seconded by Mr. O. C. HILLS, the retiring Auditor (Mr. B. W. Ellis) was re-appointed.

The CHAIRMAN proposed a hearty vote of thanks to the Managers, staff, and workpeople generally—declaring that the longer he knew them the more thankful he felt to them, and the more he admired them.

Dr. CARPENTER, in seconding the vote, thanked the proprietors for the cordial manner in which they had expressed their approval of his appointment as a Director. For many reasons he appreciated highly the opportunity extended to him of joining the Board. The first reason was that he was conscious, perhaps more than any other person in that room, of the important part that had been played by the Commercial Gas Company in building up the great gas industry as it existed to-day. Much of the foundation on which the gas industry now stood had been built up by the activities of the Commercial Gas Company. Like other foundations, they were not visible above the surface; but they existed, and to a great extent were the result of the work done for many years by that able Engineer, who achieved the highest position that an engineer could achieve in this country—he referred to the late Harry Jones. Another reason which caused him to appreciate the compliment that had been paid him was to be found in the policy, which had been so ably enunciated by Mr. Bradshaw, of extending still further what the Company had done for many years in connection with co-partnership. The Commercial Company was among the first to take up that proposition; and as time went on, all associated with the working of the system must have become conscious of the enormous power for good that it had. The working classes possessed a great potency—he might almost say—for good or ill, according to whether they were

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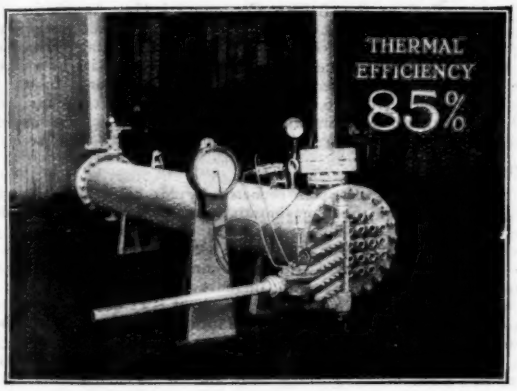

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directed or led in one direction or another; and capital had its responsibilities in this matter. He was delighted to think that the Company had, in promoting this Bill, realized the opportunities that were afforded to it of leading its employees in a direction which was bound to make them much better citizens and much greater supporters of this commonwealth than would be possible in any other way. As to the works, the precepts laid down by their former Engineer were that the best evidence which could be given of competency was not the building of large installations of plant, but the doing of what was necessary to provide the consumer with gas at the lowest price. Where other people made memorials of retort houses and gasholders, the chief memorial Mr. Jones made was in putting down plant which enabled people to get their gas at the cheapest practicable rate. This, after all, was what the consumer really wanted. While the officials had acquired all the precepts of the late Engineer, they had added to them the leaven of the latest science and knowledge relating to the gas industry. Nothing that could be said would be too much to express the indebtedness of the Company for the admirable manner in which both officers and men carried out their duties.

The vote was cordially passed, and was acknowledged by Mr. BRADFIELD and by Mr. A. E. WILLIAMS (the Chief Engineer).

The ordinary meeting concluded with a vote of thanks to the Chairman and Directors, which was proposed by Mr. FRANK JONES.

Extraordinary Meeting.

An Extraordinary Meeting was then held, for the purpose of submitting to the proprietors for their approval the Bill already referred to.

The PARLIAMENTARY AGENT (Mr. Seager Berry) briefly outlined the main proposals. The Bill, he pointed out, provided for a minimum dividend of 5 p.ct. on existing stock and 6 p.ct. on any stock issued in the future. This dividend might be paid if the Company could earn it; and the Company could put up the price of gas to what might be necessary to enable them to earn it. The Bill then provided for a basic price of 11·4d. per therm, and for the division, as explained by the Chairman, of surplus profits. Another section related to the appointment of Employee Directors.

The CHAIRMAN then formally moved:

> "That the Bill introduced into Parliament intituled 'A Bill to make new provision as to the charges for the gas supplied by, and the application of the profits of, the Commercial Gas Company, and for other purposes,' be, and is hereby, approved, subject to such additions, alterations, and variations as Parliament may think fit to make therein."

Mr. STANLEY H. JONES seconded the resolution, and it was unanimously agreed to.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDER.

Bristol Gas Company.

To enable the Company to raise further capital, and to make various provisions relating to the supply of gas and the administration of the business.

GAS AT 3⅜d. PER THERM.

Big Reductions Announced by the Sheffield Gas Company.

Reductions in the price of gas, with sweeping concessions to large consumers, are announced by the Sheffield Gas Company to take effect from the readings of the meters for the March quarter.

Small domestic consumers will benefit by a reduction of 4d. per 1000 c.ft., and the industrial concerns with large consumptions will be in a splendid position in regard to fuel costs. The concession to them means that they will pay 4d. per 1000 c.ft. less than before the coal stoppage. This reduction will doubtless have a beneficial effect on Sheffield trade.

The list of the new charges for gas consumed in any one year on one set of premises is as follows:

Up to 500 therms	7⅜d. per therm
From 500 to 2500 therms	5⅛d. ,,
From 2500 to 15,000 therms.	5⅜d. ,,
From 15,000 to 30,000 therms	5⅝d. ,,
Beyond 30,000 therms	3⅜d. ,,

History of the Malton Gas-Works.

Writing in the "Yorkshire Gazette," an "Old Hand" says that Malton was one of the first small urban areas to form a gas company. The Malton Gas-Works were erected in 1832, or only 22 years later than the formation of the Gas Light and Coke Company at London. Of course, the Malton works were very small at first; but in 1864 they were re-modelled by Mr. G. W. Stephenson, and have since been considerably added to. The works, as is well known, are the property of the Company. It was not until 1880 that the Company was incorporated in its present form, and then only after strenuous opposition from the Local Board of Health, who objected to certain clauses of the Bill. An amicable arrangement was come to, however, and both public and shareholders have profited by the increased powers of the Company. The Company owed much of its success to the efficient management of Mr. Henry Tobey, who from 1875 to a few years ago was Secretary and Manager of the Company. It is interesting to add that Malton gas stock has always been a tempting bait to speculators; and £10 shares have during the past few years made up to £27 2s. 6d. per share. The Company at the present time is paying a dividend of 12 p.ct. per annum, so there is no wonder that there is such a demand for this particular stock.

GAS COMPANIES' RESULTS FOR 1926.

Bournemouth.

The Directors of the Bournemouth Gas and Water Company report that the revenue of the past year has been adversely affected by the coal stoppage and the necessity thrown thereby on the Company of purchasing large quantities of foreign coal. The supply of both gas and water, in spite of difficulties, has been fully maintained; and the sales of gas show an increase of 6·84 p.ct. over 1925, while the water rental has also increased. The price of gas was raised from Oct. 1 last by 1·1d. per therm; but a reduction of 0·6d. per therm will be made from March 31 next. The new showrooms and offices in Old Christchurch Road, Bournemouth, will be completed and available for use in about a month's time. The proprietors will be asked, at the meeting to-morrow, to approve certain modifications in the co-partnership and pensions scheme of the Company, consequential on new legislation affecting national old-age pensions. An interim dividend at the rates per annum of 6 p.ct. on the preference shares, 7 p.ct. on the "B" shares, and 8½ p.ct. on the original shares, was paid for the half-year to June 30; and the Directors now recommend the payment of a dividend for the second half-year at the same rates. All these dividends are subject to deduction of income-tax, and, if approved, will leave to be carried forward the sum of £20,083.

Bristol.

The annual meeting of the Bristol Gas Company was held on Feb. 17. Having expressed deep regret at the death of Mr. J. H. Howell, in April of last year, the Chairman, Sir George E. Davies, said that during the coal strike a full supply of gas was maintained by the Company, who had received many letters of appreciation from consumers. The supply of coke, too, had been of great value to the city and district. Over 35,000 tons were sold locally to business and domestic consumers, while supplies to hospitals, institutions, bakers, &c., were maintained. Nearly 6000 tons were sold in 200,000 lots of ¼ cwt. and 1 cwt. to small consumers for domestic purposes. Though the cost of imported coal was more than double the cost of English supplies, the present charge for gas represented an increase of only 12½ p.ct. on the pre-strike price. The increase in gas sales amounted to 102 million c.ft. During the last ten years the number of consumers had increased by 18,000, and the yearly make of gas by 1000 million c.ft. The cookers on hire had increased during that period by 18,400; the number now being 75,130. The quantity of gas made in 1926 was nearly 4000 million c.ft., and the number of consumers had increased by 4011. The average increase in gas sold during the last five years was 100 million c.ft. per annum. The Chairman moved that a dividend be declared for the half-year ended Dec. 31 last at the rate of 5 p.ct. per annum, less income-tax. This was agreed to. Following the ordinary meeting there was an extraordinary meeting, for the purpose of approving an application to the Board of Trade under section 10 of the Gas Regulation Act. The resolution was passed unanimously.

Chester.

The annual meeting of the Chester United Gas Company was held on Feb. 14. The Secretary, Mr. H. Hopkinson, said that the balance to the credit of profit and loss account was £5407. The full basic dividend on £157,150 ordinary stock of the Company for the half-year ended Dec. 31, at 2½ p.ct., would absorb £3926; and the increased dividend in respect of the selling price of gas during the year having been below the basic price, at the rate of ¾ p.ct., would absorb £1178, leaving a balance to carry forward of £300. The Chairman, Sir John Frost, moving the adoption of the report and accounts, first of all referred to the loss which the Company had sustained in the death of Mr. Fred A. Pye, their Secretary and General Manager. He mentioned that Mr. J. H. Noble had been appointed Engineer and Manager, and Mr. H. Hopkinson Secretary. In spite of the greatly enhanced cost of coal from May onwards, the Company did not increase their charges for gas until the Christmas quarter; and then by only 1d. per therm. Each quarter of the year had shown a steady increase in gas sales; the output throughout the year representing an increase of 7·98 p.ct. They had added the same amount as in previous years to their co-partnership scheme, which was growing in power and influence. Mr. J. P. Gamon seconded the motion, and the report was adopted. The Chairman then moved that dividends be declared as follows: 4 p.ct. on £52,500 preference stock in respect of the year ended Dec. 31; 2½ p.ct. on £157,150 ordinary stock of the Company for the half-year ended Dec. 31, making with the interim dividend 5 p.ct. for the year; and in accordance with section 6, Chester Gas Act, 1922, an additional ¾ p.ct. on the ordinary stock of the Company. Mr. Gamon seconded the resolution, which was carried.

Grays and Tilbury.

Presiding at the annual meeting of the Grays and Tilbury Gas Company, Lt.-Col. F. E. Bartlett, the Chairman, said that the result of the year's working was a balance of gross profit of £20,586, compared with £18,045 for the previous year. The percentage of working expenses to revenue was 80·55 p.ct., which was satisfactory. The sales of gas had increased by 15·35 p.ct., the number of consumers by 1157, and the number of gas cookers by 1143. The balance of net profit available for dividends had increased from £11,089 to £14,834; and the carry-forward after payment of the dividends would be £10,240. The amount standing to the credit of the renewal fund was £8775—an increase of £1542 for the year. The Board wished to emphasize that during the coal strike the whole of the employees of the Company remained loyally at work. Payment of the following dividends was proposed and carried unanimously. On the preference shares, 6 p.ct. per annum; on the "A" shares, 9 p.ct.; and on the "B" shares, £6 6s. p.ct., all less income-tax.

Ilfracombe.

Presiding at the annual meeting, on Feb. 15, of the Ilfracombe Gas Company, Mr. R. M. Rowe said that the output of gas during the past year had exceeded all existing records. The dividend paid to the stock holders amounted to 5 p.ct. on the preference stock, and 5½ p.ct. on the consolidated stock.

Liverpool.

The total revenue during the year was £1,633,818, and the expenditure £1,469,907, leaving a surplus of £163,911, which was transferred to the credit of the net revenue account. Owing to the coal strike, it was necessary to increase the price of gas to 9d. per therm as from the September quarter meter reading. At the meeting of the Company on Feb. 15, Mr. H. Wade Deacon (Chairman of Directors) said that the sale of gas during the year had increased by 430 million c.ft.; and during this period they sold or let out on hire 8499 gas fires and 10,416 cookers. The net revenue account showed, after payment of interest and dividends, a balance of £61,550 to carry forward. In the circumstances, he thought all would agree that this was a most satisfactory result. The interest earned on the reserve fund had again been credited to the fund, which now stood at £176,900. Mr. H. L. Brough, after congratulating the Directors on their very satisfactory report, suggested that they should consider the advisability of undertaking an educative advertising campaign, as a great many of the general public were not fully alive to the advantages of gas. He thought increased expenditure on advertising would be a good investment. The Chairman explained that the Company subscribed to the British Commercial Gas Association. The Board, however, would bear in mind Mr. Brough's suggestion, which might lead them to the conclusion that the time had arrived when the Company should spend more on advertising on its own account. The Chairman then moved that a dividend be declared for the half-year ended Dec. 31, 1926, of £2 15s. p.ct., less income-tax, on the ordinary stock of the Company. Mr. J. Heron Eccles seconded the resolution, which was carried unanimously.

Portsmouth.

Continued progress was reported by Mr. T. H. F. Lapthorn, J.P., Chairman of the Portsmouth Gas Company, at the annual meeting on Feb. 17. The sale of gas during 1926 was 10,713,000 therms—an increase of 4·05 p.ct. There are more consumers, and the average consumption of each consumer has also increased. Cookers numbered 44,950—an increase of 3176. During the past six years cookers had increased by 26 p.ct. Fires numbered 22,358—an increase of 2623. Other appliances, such as geysers, showed an increase of 1339. The net profit was £59,663, which was £7104 less than for the previous year. After meeting various payments, there was a balance of £56,637 available for dividends, after payment of which there remained a carry-forward of £35,797, or £6985 less than last year. They had been able to postpone any increase in the price of gas until the coal strike had lasted five months; and the increase then made, which took effect from the September quarter, was only ½d. per therm, or 6½ p.ct. The present price was only 8½d. per therm. There would be a reduction of 0·3d. per therm at the end of the current quarter, and a reduction of 0·2d. per therm at the end of the June quarter. Dividends of 5 p.ct. per annum on the 5 p.ct. maximum stock, and of 7½ p.ct. on the consolidated stock, both less income-tax, were declared.

Rhymney and Aber.

In their report for the year ended Dec. 31 last, the Directors of the Rhymney and Aber Gas Company state that, in common with most other undertakings, especially those in the mining districts, the Company have suffered from the coal strike. The Company were able to maintain a full supply of gas throughout the whole of the strike. The revenue account shows a profit for the year of £15,317. After deducting the items on the debit side of the profit and loss account, there is left a sum of £8863 available for dividend purposes. Out of this the Directors recommend the payment of the dividend on the 5 p.ct. preference shares for the half-year ended Dec. 31, and a dividend of 3½ p.ct. on the consolidated ordinary stock for the same period, which, with the interim dividend of 3½ p.ct., makes 7 p.ct. for the year. This will absorb, £5868, leaving a sum of £2995 to be carried forward to next year's accounts.

Scarborough.

In moving the adoption of the report and accounts of the Scarborough Gas Company, at the annual meeting, Mr. W. S. Rowntree, J.P., the Chairman, said that, notwithstanding the coal strike, the progress of the Company had been well maintained, as was indicated by an increase of 27 million c.ft. in the sale of gas. The number of consumers had been increased by 391, and additional gas appliances had been fitted to the extent of 773 cookers, 511 fires, 426 wash-coppers, and numerous miscellaneous apparatus. It was estimated that there were in use in the Company's area 10,000 cookers, 7500 fires, and 3000 wash-coppers. The maximum dividend of 5 p.ct. (less income-tax) was declared; an interim dividend of 2½ p.ct. having been paid in August. Following the ordinary meeting, an extraordinary meeting was held to approve the Bill which the Company are promoting in Parliament. Provision has been made in the Bill for increasing the capital of the Company, to meet future expansion. The total amount of capital authorized at present is £474,062, of which amount only £53,507 remains unissued; and it has been thought desirable to seek powers to increase the amount to £600,000. It is also proposed to alter the method of regulating the Company's price of gas and dividends. A contribution to a co-partnership fund to be established on behalf of the employees will also be made. The proposal met with unanimous approval.

Seaton.

The Seaton (East Devon) Gas Company report that, despite the coal strike, their profits have been maintained. During the past year new purifiers have been installed to replace the old ones. In order to meet the greatly increasing demand for gas, the Company propose to make considerable extensions of the mains. The cost, the Directors anticipate, will be £1000; and they invite the shareholders to subscribe for shares for that sum. They recommend a dividend of 6 p.ct., less income-tax.

South Surburban.

The report of the Directors for the year ended Dec. 31, to be submitted at the annual meeting next Friday, states that, notwithstanding adverse circumstances, the expansion of the Company's business during the past twelve months has been well maintained. The sales of gas increased by 3·9 p.ct., as compared with the previous year; and the number of consumers by 4850. During the same period the number of gas cookers, fires, &c., hired or sold to consumers has increased by no less than 12,308. The accounts show that, including the balance of £2038 brought forward from the previous year, and after providing for all debenture and other interest charges, and payment for the first half of the year of a statutory dividend at the rate of 6½ p.ct. per annum, less income-tax, there remains a balance of £43,586, out of which the Directors recommend payment for the second half-year of a dividend at the rate of 6½ p.ct. per annum, less income-tax, leaving the sum of £3162 to be carried forward to next account. As a result of the Company's application in the early part of the year, the Board of Trade on Aug. 5 granted an Order amending the Company's standard price, and increasing the borrowing powers of the Company. An agreement has been entered into with the South Metropolitan Gas Company, which will be submitted for the approval of the proprietors at an extraordinary meeting to follow the general meeting.

Sutton.

Gratifying progress was reported by the Directors at the annual meeting of the Sutton Gas Company, when a dividend making 7½ p.ct., less income-tax, for the year was declared. In view of the increased cost of coal, the price of gas was raised for the last quarter of the year to 10·6d. per therm in the Sutton and Cheam limits, and 11·4d. in the outer area of the Company's district. The Directors have, however, recently notified an immediate reduction to 10d. and 10·8d. per therm in the respective areas. The gas sold last year was 4·8 p.ct. more than in 1925. Additional plant will in the near future be required to meet the growing demands for gas. Councillor A. Bennetts, speaking at a luncheon which preceded the meeting, said that the Sutton Gas Company were ever ready to meet the requirements of the town and district in a fair and reasonable spirit.

Wandsworth, Wimbledon, and Epsom.

In the report for the year ended Dec. 31, to be submitted at the meeting next Tuesday, the Directors of the Wandsworth, Wimbledon, and Epsom District Gas Company state that the abnormal conditions which obtained during the greater part of the year, owing to the coal dispute, are reflected in the accounts. The extra price paid for coal of foreign origin over the whole period of the stoppage has necessitated an increase in the price of gas during the last quarter of the year of 1·6d. per therm. This was in accordance with the Gas (Amending Orders) Rules, 1926, of the Board of Trade; and the Order will remain in force until June 30 next. There has been an increase in the sale of gas of 6·1 p.ct. The number of consumers has increased by 2848, and the number of stoves and other appliances by 6100. The profit and loss (net revenue) account for the year, after providing for the interest on debenture stocks and on deposits and loans for the past twelve months, and the dividends for the six months ended June 30, 1926, at the statutory rates, shows a balance of £56,225. The Directors recommend payment of dividends for the half-year to Dec. 31 last as follows: On the 5 p.ct. preference stock, £5 p.ct., and the statutory rates on the Wandsworth "A" stock, £8 10s.; the Wandsworth "B" stock, £7; the Wandsworth "C" stock, £5 19s.; the Wimbledon stock, £6 12s. 6d.; the Epsom stock, £7 2s. 6d.; and the new ordinary stock, £5 19s.—all at p.ct. per annum.

CONTRACTS OPEN.

Stores, &c.

The Gas Committee of the Clonmel Corporation are inviting tenders for the supply of stores and fittings. [See advert on p. 467.]

Pipes and Specials.

Tenders are invited by the County Borough of Burnley Gas Department for the supply of gas pipes and specials. [See advert. on p. 467.]

Oxide of Iron (New and Spent).

Tenders are invited by the Manchester Corporation Gas Committee for the supply of new, and the purchase of spent, oxide of iron. [See advert on p. 467.]

Tar.

The Gas Committee of the Manchester Corporation are inviting tenders for the purchase and removal of carburetted water gas tar. [See advert on p. 467.]

Weighing Machines (Repairs and Maintenance).

The Gas Committee of the Manchester Corporation are inviting tenders for the adjustment, repair, and maintenance of the weighing machines at their several works. [See advert on p. 467.]

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

There is no material improvement in the position from the point of view of producers. The imports of foreign coal are, it is true, nearing an end, and the coastwise shipment of gas coals is gradually increasing. But export trade, upon which Durham and Northumberland are so largely dependent, remains extremely disappointing. All offers to the Continent are met with counters at lower rates, and, though producers on this side may protest that they cannot reduce quotations on their present costs of production, this does not help the position if cheaper supplies are available elsewhere. Shipping delays owing to the recent fogs have accounted for idle time at many of the collieries; but there is also a distinct shortage of trade in many cases, and orders have had to be accepted at cut prices for spot cargoes.

The best market at present is for coke, all kinds of which are in steady demand, gas being firm at 23s. 6d. f.o.b. This has, however, so far found no reflection in the market for coking coals, which are only moderately steady at 16s. 3d. to 16s. 9d. f.o.b. Quotations for gas coals are 18s. for Wear Specials, 17s. 3d. to 17s. 9d. for best qualities, and 15s. 9d. to 16s. 3d. for seconds. But with gas coals, like all others, the position is that forward contract business, especially for export, is at a standstill, and odd prompt cargoes are by arrangement according to the position of tonnage and the needs of individual collieries.

YORKSHIRE AND LANCASHIRE.

Gas coal in Yorkshire and Lancashire is moving steadily under contract, with indications that open market business is slightly discounted in price as compared with contract figures. Several collieries report that they will be re-opening their coke-ovens shortly. The demand for this description has been rather better during the past few weeks.

Delays in traffic continue, but on a modified scale.

House coal is still being ordered only in small quantities, partly owing to the comparatively mild weather.

The industrial section will evidently take some time to recover from last year's stoppage. This market is spasmodic, with the commoner fuels in less request than those of a better grade.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 21s. 6d. to 21s. 9d.; screened gas coal, 22s. 6d. to 23s. 6d.; washed doubles, 24s. to 25s.; washed singles, 20s. 9d. to 21s.; washed smalls, 17s. to 17s. 6d.; unwashed doubles, 20s.; rough slack, 13s. 3d. to 13s. 6d.; smithy peas, 23s. 6d. to 25s. 6d. per ton. West Yorkshire—Hartley's (f.o.b. Goole), 21s. to 22s. 6d.; washed doubles, 21s. to 22s. 6d.; washed singles, 18s. 6d. to 20s. 6d.; washed smalls, 14s. 6d. to 16s.; unwashed doubles, 18s. to 18s. 6d.; rough slack, 13s. 6d.; coking smalls, 11s. 6d. per ton. Derbyshire and Nottinghamshire—Top hards, 23s. to 24s. 6d.; washed doubles, 22s. to 23s. 6d.; washed singles, 20s. 6d. to 21s.; washed smalls, 15s. 3d. to 15s. 9d.; unwashed doubles, 19s. to 20s.; rough slack, 13s. 6d. to 14s. 6d. per ton. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 20s. to 21s.; gas coke, 31s. to 34s.; furnace coke, 27s. to 27s. 6d. per ton.

MIDLANDS.

While there is an easier tone generally, collieries are still behind their engagements as regards some grades, chiefly the superior descriptions of house coal. Quotations for best hand-picked deep run up to about 43s., pithead. Apart from these exceptions there has been no difficulty in keeping pace with the requirements of the domestic user. Good-grade coals can now be bought at about 35s.

The industrial consumer, although he has obtained concessions (perhaps because he has obtained concessions), still considers prices too high, and is buying only from hand to mouth. Steams make 20s. upwards; D.S. nuts, 15s. to 16s.; beans, 11s. 6d. to 13s.; slacks, 8s. to 10s. for good nutty samples, and less in proportion for inferior grades. Though spot lots are to be picked up occasionally at low prices, it does not appear that collieries have as yet done much to accumulate stocks for their own service.

Foundry cokes are in good supply at 30s. to 35s. on rail. The dearth of blast-furnace coke is intensified, and quotations now range from 21s. to 26s. at ovens. Concern is caused among pig iron producers by the slow expansion of output. There are more complaints again about the inadequacy of the rail transport. Fog has aggravated the trouble.

Reduction in Price at Hebden Bridge.—The Hebden Bridge and Mytholmroyd Gas Board on Feb. 17 decided to reduce the charge for gas locally by 4½d. per 1000 c.ft.; the loss arising out of the extra costs of the coal dispute having been less than expected.

Fatal Accident at the Warwick Gas-Works.—A foreman stoker named Fretwell, who had been employed by the Warwick Gas Company for 42 years, slipped from a gantry while unloading coke at the gas-works, and died subsequently in the Warneford Hospital, Leamington. A verdict of "Accidental death" was returned at the inquest.

Gas Lecture at Halifax.—Mr. W. B. McLusky, Gas Engineer and General Manager to the Halifax Corporation, lectured on the manufacture and distribution of gas, on Feb. 10, to the members of the Belle Vue Park "Parliament." Mr. McLusky briefly outlined the history and development of the Halifax gas undertaking since its commencement by a private company in 1822. He remarked that the Corporation were preparing to make extensive changes in plant to bring it completely up-to-date. Mr. McLusky paid high tribute to the work of Messrs. Drakes, Ltd., of Halifax, as gas constructional engineers.

TRADE NOTES.

Automatic Weighing Machines.

Messrs. Samuel Denison & Son, Ltd., of Leeds, have published a series of booklets describing and illustrating their Blake-Denison weighing machines.

Painting Gasholders and other Metal Structures.

We have received from Messrs. W. G. Beaumont & Son, of Priory Works, Bow, E. 3, an almanac illustrating a rotund painter, at work on a steel structure, suspended on a small seat over the sea. A humorous legend is appended.

Gas Cooking Apparatus for Hotels, &c.

Messrs. William Sugg & Co., Ltd., of Westminster, are to be congratulated on the high standard of the booklet which they have just published dealing with gas cooking appliances for hotels, restaurants, and institutions. The illustrations are excellent, and the descriptions of the various apparatus clear and complete.

"Spersom" Fittings, &c.

Messrs. Sperryn & Co., of Moorsom Street, Birmingham, intimate that during the run of the British Industries Fair at Birmingham (Feb. 21 to March 4) special arrangements have been made at their works for visitors to inspect the equipment and the many quality productions they manufacture, which include small gas fittings, main and gas stove cocks, &c.

"Nuswift" Fire Extinguishers.

Messrs. J. Blakeborough & Sons, Ltd., have acquired from Messrs. Nuswift (Bradford) the sole manufacturing and selling rights of the "Nuswift" patent fire extinguisher. The services of Mr. J. A. Goodall, the patentee, have been retained, and business will in future be dealt with at the works of Messrs. Blakeborough, Woodhouse Works, Brighouse, to which address all communications should be forwarded.

CURRENT SALES OF GAS PRODUCTS.

Tar Products in the Provinces.

Feb. 21.

The average values for gas-works products during the week were: Gas-works tar, 77s. to 82s. Pitch, East Coast, 105s. to 110s. f.o.b. West Coast—Manchester, 102s. 6d. to 107s. 6d.; Liverpool, 105s. to 110s.; Clyde, 107s. 6d. to 110s. Benzole, 90 p.ct., North 1s. 9d. to 1s. 10d.; crude, 65 p.ct. at 120° C., 1s. 2½d. to 1s. 3d., naked at makers' works; 50-90 p.ct. naked, North, 1s. 10d. to 1s. 11d. Toluole, naked, North, 1s. 8½d. to 1s. 9¼d., nominal. Coal-tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5½d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 7½d. to 7⅝d.; salty, 7½d. to 7½d.; Scotland 7½d. to 7⅝d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 1s. 8½d. to 1s. 9½d. prompt. Naphthalene, £11 to £14; salts, 100s. to 110s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 21.

Pitch continues dull, and the current price is about 110s. to 115s. per ton in bulk at makers' works.

Creosote is scarce, and the price remains steady at about 8¾d. to 9d. per gallon in bulk.

Solvent naphtha is quiet at about 1s. 9d. per gallon for 95/160 quality. Pure toluole is about 2s. 5d. to 2s. 6d. per gallon, and pure benzole about 2s. 3d. per gallon.

Crystal carbolic acid is weaker at about 6d. per lb. in large drums and overcasks.

Maintenance at Dunfermline.

Discussion on this subject took place at a meeting of the Dunfermline Town Council on Feb. 14. The Gas Committee had approved of the proposals generally, and thought that the scheme should be tried as an experiment for six months, and that one employee should be engaged on the work for that time. The Committee also resolved that the local architect, measurer, and plumber should be communicated with as to the ruling now definitely made by the Committee. This is to the effect that specifications or other sufficient particulars of intended work for the introduction of gas into houses and other properties, and for the piping of such subjects, should be submitted beforehand to the Gas Manager for approval on the part of the Gas Department, and as to option available by owners under the Burgh Gas Supply Act and relative statutes, and to have the gas service laid in by the Corporation at the owners' expense. Bailie Smith said that their desire was that the gas consumer might have every satisfaction with the service. It was not their intention to interfere with private plumbers' work. Councillor Ritchie moved an amendment that they would not go further into this until a conference was held. The matter was remitted back to the Gas Committee.

Explosion at Hackney.—An explosion occurred at Hackney on Feb. 17; and a workman was blown from an excavation hole in the road. Considerable damage was done to property, but no one was seriously injured. The scene of the explosion was Perch Street, a short road leading to Shacklewell Lane, where Borough Council employees had been at work on electric light cables. The Fire Brigade were summoned, and Gas Company employees arrived, and set to work to perforate the roadway to enable any accumulated gas to escape.

Fatal Result of an Explosion in Acton Lane.—Early on Saturday last an explosion wrecked a small shop in Beaconsfield Road, Acton Lane, and imprisoned two of the occupants, Mr. and Mrs. Waterworth, under the débris. A smell of gas had been noticed, and the occupants were leaving the premises at the time the accident occurred. Mrs. Waterworth, who was 59 years of age, later succumbed to her injuries. Mr. Waterworth was severely hurt.

Further Capital for the Rochester, &c., Gas Company.—By instruction of the Directors of the Rochester, Chatham, and Gillingham Gas Company, Messrs. A. & W. Richards are offering for sale by tender £20,000 of consolidated ordinary stock of the Company ranking for a standard dividend of 5 p.ct., subject to a sliding-scale, equally with the existing ordinary stock now receiving 6¼ p.ct. per annum. The minimum price of issue is £92 10s. per £100. Tenders are to be forwarded to the firm at 37, Walbrook, E.C., by Thursday morning, March 3.

How Science Aids the Housewife.—To what a remarkable extent the factor of hygiene in the home is being promoted by the use of modern domestic appliances is revealed by the exhibits now being prepared for the "Daily Mail" Ideal Home Exhibition. The home refrigerator, working either by gas or electricity, of Electrolux, Ltd., is a typical example of the achievements of modern science in the sphere of domestic utility. In this appliance the highest possible degree of efficiency has been obtained, while the factor of dependability upon the skill or knowledge of the user has been eliminated entirely.

Gas Undertakings to Amalgamate.—Arrangements have been arrived at whereby the business of the Studley Gas Company, which has been existence for 60 years, will be taken over in June next by the Redditch Gas Company, Ltd. The scheme provides for the merging of the capital of the Studley Company into the Redditch Company and the voluntary winding-up of the Studley Company. The reasons given for the absorption of the latter Company are that its business has so increased that it is impossible to cope with the position without a considerable increase of capital, and without alterations and enlargements of the present works.

For having taken 17s. 3d. from a Corporation gas meter, Daniel Jones was at Edinburgh Police Court fined £2, or 20 days' imprisonment.

The sports club in connection with the Plymouth and Stonehouse Gas Company held a social gathering at the Co-Operative Hall, Plymouth, on Tuesday evening, Feb. 15.

The Walton-le-Dale District Council have resolved that a price be obtained from the Lancashire Electric Power Company for converting the street lamps from gas to electricity.

The members of the Keighley Association of Engineers recently visited the Keighley Corporation Gas-Works at Thwaites, and were shown over the plant by Mr. R. Calverley (Chairman of the Gas Committee) and Mr. A. Bromley (Gas Engineer and Manager).

The Llanidloes Gas Company have notified the Llanidloes Town Council that they do not intend to make the full increase in charges sanctioned by the Board of Trade, but that from Nov. 1 last the charge would be at the rate of 8s. 4d. per 1000 c.ft.

A house in Leamington was the scene of a gas explosion on Sunday morning, just after a maid had lit a gas ring in the scullery. A good deal of damage resulted to the premises. Gasfitters afterwards discovered that there was a split 9 in. long in a gas tube.

On Feb. 19 the Stretford and District Gas Board Social Club took tea together; among those present being Mr. R. J. McBeath, J.P. (Chairman of the Board), and Mr. W. M. Carr, the Engineer. Mr. McBeath spoke of the spirit of harmony which existed among the employers and employed in the gas undertaking. This co-operation not only furthered the success of the undertaking, but rendered their work pleasant. Whist, a concert, and dancing were arranged for the evening, which proved very enjoyable.

At a meeting of the Evesham Town Council on Wednesday last, Councillor Gill-Smith, Chairman of the Gas Committee, presented figures relative to the cost of the coal strike to his Department. He said that during the stoppage 765 tons of Westphalian coal, 2169 tons of American coal, and 942 tons of outcrop were bought at a cost of £12,747. In normal times the coal would have cost £5418; and the strike had thus cost the Department about £7000 extra for coal alone. This, he thought, was sufficient explanation for the high charge which they had found it necessary to make for gas.

Details of how three adults and two children were found at Walkden, suffering from the effects of gas poisoning following a leak in a street main, were given at a Bolton inquest on Robert Mills (13). Edward Wilkinson, surface layer for the Corporation, said he discovered that the main in front of the house had broken. The pipe was a 3-in. cast-iron one, and would be 35 years old. There was no corrosion. There must have been a subsidence of the ground which placed a certain amount of pressure on the main. Recording a verdict of "Accidental death," the Coroner commented on the promptitude of the Gas Department.

A piece of ground in the neighbourhood of the Dundee Gas-Works may be secured by the Corporation for extension purposes. The question was raised before the Law and Finance Committee of the Town Council on Feb. 10, when a letter from an agent was read referring to the fact that the Britannia Works, in Dock Street, belonging to Messrs. Cooper & Greig, Ltd., engineers and boilermakers, were in the market, and suggesting the possibility of at least a part of the ground being suitable for one or other of the Corporation departments. The needs of the Gas Department were explained to the meeting, and a Committee was appointed to meet the parties concerned.

STOCK MARKET REPORT.

BOTH investors and speculators were inclined to be cautious on the Stock Exchange last week. The somewhat alarming news from China caused gilt-edged securities to droop, and the depression was accentuated by the large number of the recent new issues, particularly Corporation Stocks. These stocks were prominently before the market; but values both of old and new issues, in the absence of purchasers, were slightly lower. All hope of an early reduction in the Bank Rate has disappeared, but it is not expected that there will be an increase. More attention was given to European Construction Loans, and Belgian Sevens reached a new record at 107.

With the dividend declaration of the London and North Eastern Company, the worst of the railway position is now known; and although the reserves of all the companies are sadly depleted, with coal at normal value and the new schedule of rates in force, no anxiety need be felt for the current year.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Feb. 18.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 10	5	5	Aldershot 5 p.c. max. C. .	70—73*	..	..
322,999	,,	,,	4	4	Do. 4 p.c. Pref. .	66—71*	..	..
1,551,868	,,	Sept. 30	6½	6½	Alliance & Dublin Ord. .	81—86	..	85¼—85
574,000	,,	Jan. 13	4	4	Do. 4 p.c. Deb. .	65—68	..	..
300,000	1	Oct. 14	1/7½	1/7½	Bombay, Ltd. . . .	1—1¼	..	21/10½
170,000	10	Aug. 26	8½	8½	Bournemouth 5 p.c. . .	12—13	..	..
500,050	10	,,	7	7	Do. B 7 p.c. .	12—13	..	..
275,000	10	,,	6	6	Do. Pref. 6 p.c. .	11—12	..	..
50,000	Stk.	Jan. 13	3	3	Do. 3 p.c. Deb. .	58—66	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb. .	73—76	..	76
214,740	,,	Aug. 26	12	12	Brighton & Hove Ord. .	163—168	..	165½—167½
344,300	,,	,,	9	9	Do. A Ord. .	125—130	..	..
1,287,500	,,	July 22	5	5	Bristol 5 p.c. max. . .	85½—86½a	+1	..
855,000	,,	Sept. 30	7	8	British Ord.	107—110	..	108½—109
100,000	,,	Dec. 30	7	7	Do. 7 p.c. Pref. . .	112—117	..	116
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. .	75—80	..	..
100,000	10	Dec. 9	8	6	Cape Town, Ltd. . . .	7—8	..	..
100,000	10	Oct. 28	4½	4½	Do. 4½ p.c. Pref. . .	6—7	..	..
180,000	Stk.	Dec. 30	4½	4½	Do. 4½ p.c. Deb. . .	68—73	..	..
626,860	,,	July 22	6	6	Cardiff Con. Ord. . . .	97—100	..	..
287,860	,,	Dec. 30	7½	7½	Do. 7½ p.c. Red. Deb. .	100—103	..	..
187,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord. . . .	89—94b	..	..
79,185	1	Sept. 30	†2/-	†2/-	Colombo Ltd. Ord. . . .	27/—29/-	..	..
24,495	1	,,	1/4⅜	1/4⅜	Do. 7 p.c. Pref. .	20/—22/-	..	..
321,490	1	Oct. 14	1/9⅜	1/7½	Colonial Gas Assn. Ld. Ord.	25/—27/-	..	25/10½
173,900	1	,,	1/9⅜	1/7½	Do. 8 p.c. Pref.	21/—23/-	..	21/-
1,818,280	Stk.	Aug. 1	5½	5½	Commercial 4 p.c. Cap. .	84—87	..	85
660,000	,,	,,	5/3/4	5/3/4	Do. 3½ p.c. Cap. .	81—84	..	83
475,000	,,	Dec. 30	3	3	Do. 3 p.c. Deb. .	54—57	..	56
800,000	,,	Sept. 30	§2	§1	Continental Union, Ltd. .	28—33	..	..
200,000	,,	,,	7	7	Do. 7 p.c. Pref. .	82—85	..	..
787,150	,,	Aug. 12	6½	6½	Croydon sliding scale . .	96—99	..	..
409,100	,,	,,	5	5	Do. max. div.	78—81	..	..
492,270	,,	Aug. 26	9	6	Derby Con.	107—109e	..	..
55,000	,,	Dec. 30	4	4	Do. Deb.	73—75e	..	..
909,000	,,	Sept. 16	5	5	East Hull Ord. 5 p.c. . .	78—82	..	..
50,000	,,	Dec. 30	5	5	Eastbourne 5 p.c. Deb. .	90—95	..	..
1,002,180	10	Sept. 30	†4	†3	European, Ltd.	6—7	..	6⅜
18,747,460	Stk.	Feb. 10	5/1/4	5	Gas Light & Coke 4 p.c. Ord.	86½—88½*	+½	87—88
2,800,000	,,	,,	3½	3½	Do. 3½ p.c. max. . . .	58—61*	..	59½—60½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref. .	74—77*	..	75⅝—76⅛
5,602,620	,,	Dec. 30	3	3	Do. 3 p.c. Con. Deb. .	58—61	..	59—60
181,315	,,	,,	—	6	Do. 6 p.c. Br'tf'd Rd. Db.	100—105	..	..
1,642,770	,,	,,	—	5	Do. 5 p.c. Red. Deb. .	99—100	..	99⅝—100
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb. .	..	..	..
82,500	,,	Aug. 26	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	87—92	..	..
288,740	,,	,,	5⅔	5⅔	Do. 3½ p.c. Conv.	66—71	..	..
70,000	10	Oct. 14	†10	†10	Hongkong & China, Ltd. .	12—13	..	..
173,300	Stk.	Sept. 16	6	6	Hornsey Con. 3½ p.c. .	69—71	..	..
1,976,000	,,	Nov. 11	‡10	10	Imperial Continental Cap.	133—136	+1	134½—136
226,170	,,	Feb. 10	3½	3½	Do. 3½ p.c. Red. Deb.	67—69*	..	..
295,242	,,	Aug. 12	6½	6½	Lea Bridge 5 p.c. Ord. . .	94—99	..	97
2,145,907	,,	Aug. 12	5½	5½	Liverpool 5 p.c. Ord. . .	82—83b	+1	..
600,000	,,	Sept. 30	7	7	Do. 7 p.c. Red. Pref.	104—106b	..	101
165,786	,,	Aug. 26	8	9	Maidstone 5 p.c. Cap. . .	112—117	..	..
63,480	,,	Dec. 30	3	3	Do. 3 p.c. Deb. . .	52—57	..	..
75,000	5	Dec. 9	†7	†7	Malta & Mediterranean .	5½—6⅜	..	..
541,920	Stk.	Nov. 25	†6	†5	Montevideo, Ltd. . . .	80—83	+1	..
3,061,315	,,	Aug. 12	5	5	Newcastle & Gateshead Con.	72½—73¼d	..	..
350,229	,,	,,	4	4	Do. 4 p.c. Pref. .	70—72d	..	..
691,705	,,	Dec. 30	3½	3½	Do. 3½ p.c. Deb. .	67½—67¾d	..	..
15,000	,,	Aug. 26	11½	11½	North Middlesex 10 p.c. .	155—160	..	..
91,580	,,	,,	8½b	8½b	Do. 7 p.c. .	109—114	..	..
800,000	,,	Nov. 25	7	9	Oriental, Ltd.	97—102	..	101½—101½
188,120	,,	Dec. 30	7⅛	7⅛	Plym'th & Ston'house 5 p.c.	105—110	..	..
414,500	,,	Aug. 26	—	7/4/0	Portsm'th Con. Stk. 4 p.c. Std.	102—107	..	..
236,782	,,	,,	—	5/0/0	Do. 5 p.c. max.	78—81	..	..
2,289,909	1	—	—	—	Primitiva Ord.	14/—15/-	..	14/—14/9
289,200	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb. . .	84—86	..	..
600,000	Stk.	Jan. 27	4	4	Do. 4 p.c. Red. Deb. 1911	69—71*	..	..
434,963	,,	Dec. 30	—	4	Do. 4 p.c. Cons. Deb. . .	69—71	..	70½—71
150,000	10	Sept. 30	6	6	San Paulo 6 p.c. Pref. . .	7½—8	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	47—50	..	..
270,000	Stk.	Sept. 16	6	5⅔	Sheffield A	96—98e	..	..
419,968	,,	,,	6	6⅔	Do. B	96—98e	..	..
1,047,000	,,	,,	6	5⅔	Do. C	96—98e	..	..
90,000	10	June 11	4	—	South African	4—6	..	..
5,609,895	Stk.	Aug. 12	7	5	South Met. Ord.	98—100	+½	98½—99½
1,895,445	,,	Jan. 13	3	3	Do. 3 p.c. Deb. . .	57—60	..	59
734,000	,,	Sept. 16	6½	6½	Do. 6½ p.c. Red. Db.	101—103	..	..
91,500	,,	Aug. 12	8½	8½	South Shields Con. . . .	114—116d	..	..
1,243,795	,,	Aug. 12	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	103½
368,837	,,	Dec. 30	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Oct. 14	5	5	South'mpton Ord. 5 p.c. max.	76—79	..	..
121,275	,,	Dec. 30	4	4	Do. 4 p.c. Deb.	68—73	..	..
250,000	,,	Aug. 26	7	7	Swansea 7 p.c. Red. Pref. .	100—102	..	..
200,000	,,	Dec. 30	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	,,	July 22	7½	7½	Tottenham District A 5 p.c.	105—110	..	..
882,275	,,	,,	5½	6½	Do. B 3½ p.c.	91—94	..	92½—93
160,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	99—101	..	..
181,255	,,	Dec. 9	4	4	Do. 4 p.c. Deb.	72—75	..	..
258,251	,,	Aug. 26	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, &	69½—70½d	..	..
197,294	,,	Aug. 26	6⅔	6½	Wycombe 5 p.c. . . .	87—92	+2	90½—91
88,330	,,	,,	5	5	Do. 5 p.c. pref. .	83—88	..	87
91,800	,,	,,	6⅔	6½	Do. 5 p.c. Maidenh'd	85—90	..	..
30,000	,,	July 8	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c. .	122—127	..	125—126
265,686	,,	,,	7	7	Do. B 3½ p.c. .	102—107	..	105—105½
432,535	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	89½—90
852,000	,,	,,	6⅔	6⅔	Wimbledon 5 p.c. . . .	98—103	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	104—109	..	..
88,416	,,	Dec. 30	3	3	3 p.c. Deb.	54—57	..	56

Quotations at:—a.—Bristol, b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. *Ex. div. † Paid free of income-tax. ‡ Plus 8½ p.c. p.a. special dividend. § For year.

In the Industrial Market, Artificial Silks were most in demand on the satisfactory and unexpected dividend announcement. The general warning last week in respect of oil shares had its effect; and with a falling-off in the demand, prices fell.

The Gas Market was quite satisfactory. The business done was above the normal, and there were no set-backs. The companies' reports and accounts are now rapidly being published; and although in most cases a deficit on the year's working is shown, the shortages are less than was anticipated. The Uxbridge, Bristol, Liverpool, Gas Light, and South Metropolitan Companies stocks were all marked up. Dividend announcements at the same rates as for the previous year are recommended by the Swansea, Derby, Sheffield, and Croydon Companies.

The following transactions were recorded during the week:

On Monday, Bombay 21s. 10½d., Brighton and Hove (10 p.ct.) 167½, British 108½, Colonial 25s. 10½d., 8 p.ct. preference 21s., European 6⅜, Gas Light and Coke 87, 87¼, 87⅜, 87½, 88, 4 p.ct. preference 75½, 76½, 3 p.ct. debenture 59, Imperial Continental 134½, Liverpool 7 p.ct. preference 101, Newcastle 3½ p.ct. 70½, 71, Oriental 101¼, 101½, Primitiva 14s., 14s. 3d., 14s. 6d., South Metropolitan 98½, 98⅝, South Suburban 5 p.ct. 103½, Uxbridge, Maidenhead, 5 p.ct. preference 87. Supplementary prices, Croydon 6 p.ct. debenture 98, Gas Light and Coke 5 p.ct. debenture 99⅛, 99⅞, Hornsey 5 p.ct. preference 86½, Sunderland 6 p.ct. maximum 98⅝.

On Tuesday, Alliance and Dublin 84, 85, Bournemouth 4 p.ct. debenture 76, Brighton and Hove 10 p.ct. 165¾, 166¼, Gas Light and Coke 87¼, 87⅜, 87⅝, 88, 4 p.ct. preference 76, 76½, 3 p.ct. debenture 59, 60, Imperial Continental 135, Primitiva 14s., 14s. 3d., 14s. 6d., 14s. 7½d., South Suburban 5 p.ct. 103½. Supplementary prices, British 5 p.ct. debenture 95¾, Gas Light and Coke 5 p.ct. debenture 100.

On Wednesday, Brighton and Hove 10 p.ct. 165½, British 109, 7 p.ct. preference 116, Gas Light and Coke 87¼, 87½, 87⅝, 3½ p.ct. maximum 59½, Imperial Continental 136, Primitiva 14s. 1½d., 14s. 3d., 14s. 6d., 14s. 7½d., 4 p.ct. debenture 70½, 71, South Metropolitan 98½, 98¾. Supplementary prices, Guildford consolidated 96, 96½.

On Thursday, Brighton and Hove 10 p.ct. 166½, Gas Light and Coke 87½, 87⅝, 87⅞, 3½ p.ct. 60½, 3 p.ct. debenture 59½, 59⅔, 5 p.ct. debenture 100, Newcastle 3½ p.ct. 71⅛, Primitiva 14s. 3d., 14s. 6d., 14s. 7½d., South Metropolitan 98½, 3 p.ct. debenture 59, Uxbridge 5 p.ct. 90½, 91. Supplementary prices, Brighton and Hove 7 p.ct. debenture 104, 104½, North Middlesex 6 p.ct. preference 104½.

On Friday, Alliance and Dublin 83½, Bristol 5 p.ct. maximum 85, Commercial 4 p.ct. 85, 3½ p.ct. 83, 3 p.ct. debenture 56, Gas Light and Coke 87¼, 87½, 87⅝, 88, 3½ p.ct. maximum 59½, 59⅝, 59⅔, 60, 4 p.ct. preference 76, 5 p.ct. debenture 99⅝, Imperial Continental 134½, 135, Lea Bridge 5 p.ct. 97, Primitiva 14s. 3d., 14s. 6d., 14s. 7½d., 14s. 9d., South Metropolitan 98½, 98⅝, 99, 99¼, Tottenham "B" 92½, 93, Wandsworth "A" 125, 126, "B" 105, 105½, "C" 90, 3 p.ct. debenture 56, North Middlesex 6 p.ct. preference 104½, 7½ p.ct. debenture 102⅜, 102½, Southgate and District 7½ p.ct. debenture 102½, 103, Wandsworth 3½ p.ct. new 89½.

Credit was abundant in Lombard Street; and while 4 p.ct. was the usual rate for renewal of old loans, fresh money was available from 3¾ p.ct. down to as low as 3 p.ct. The discount market remained firm, and the higher quotation at which Treasury Bills were allotted—£4 6s. 10·61d. p.ct—accorded with the market expectation.

On the Foreign Exchange Market the Dollar-Sterling was dull, and the final quotation—4.85—showed a decline of 1/32. The Paris rate moved upwards, and closed at 123.85. Italian lire appreciated slightly to 111¾. Both Belgian and Dutch exchanges moved against this country, at 34.88 and 12.12 respectively.

Silver was erratic, and dropped towards the close on Chinese sales to 26½d. per oz. No Gold movements took place, and the price remained nominally at 84s. 10½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3, 1925. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

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